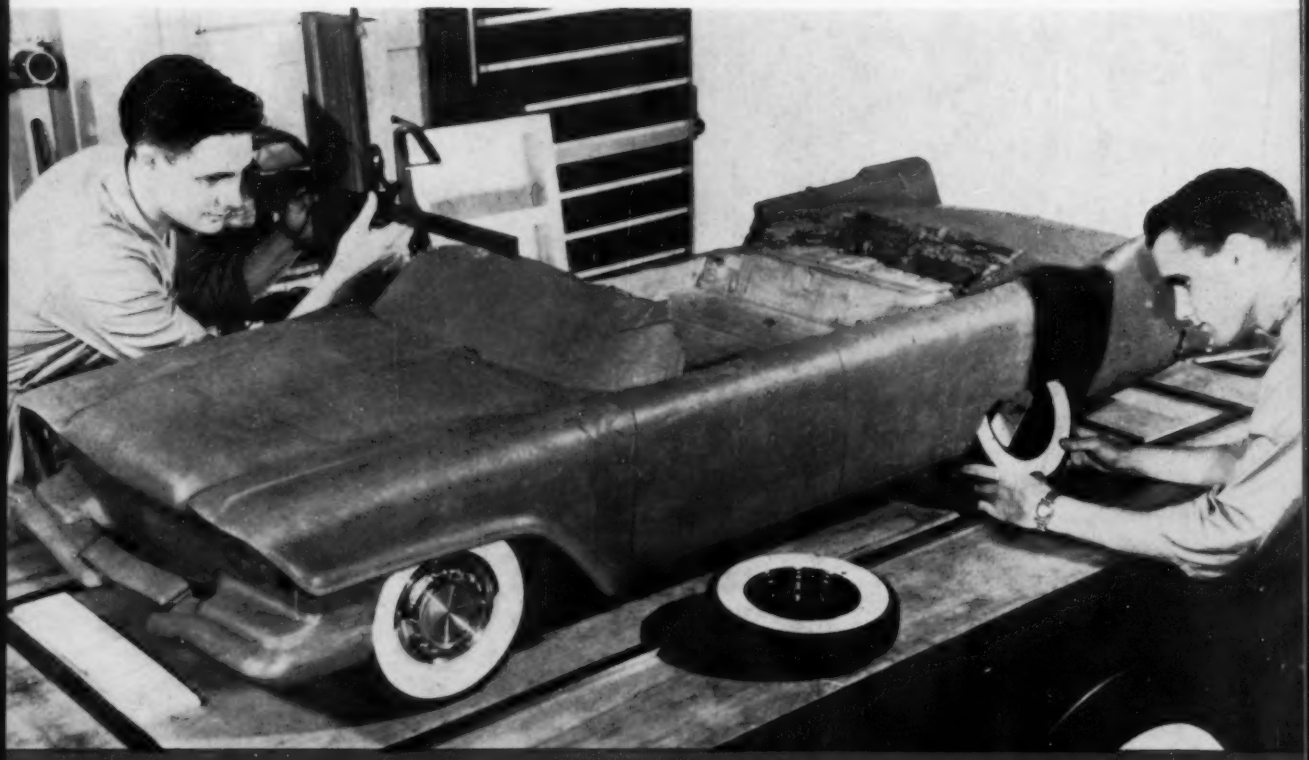
October 25, 1956

The IRON AGE

The National Metalworking Weekly



Detroit: How Big A Customer? P. 63

Take Guesswork Out Of Drawing Lubricants P.103

Farm Equipment: Are New Products A Must? P. 68

Digest of the Week P – 2

THE OTHER TURN

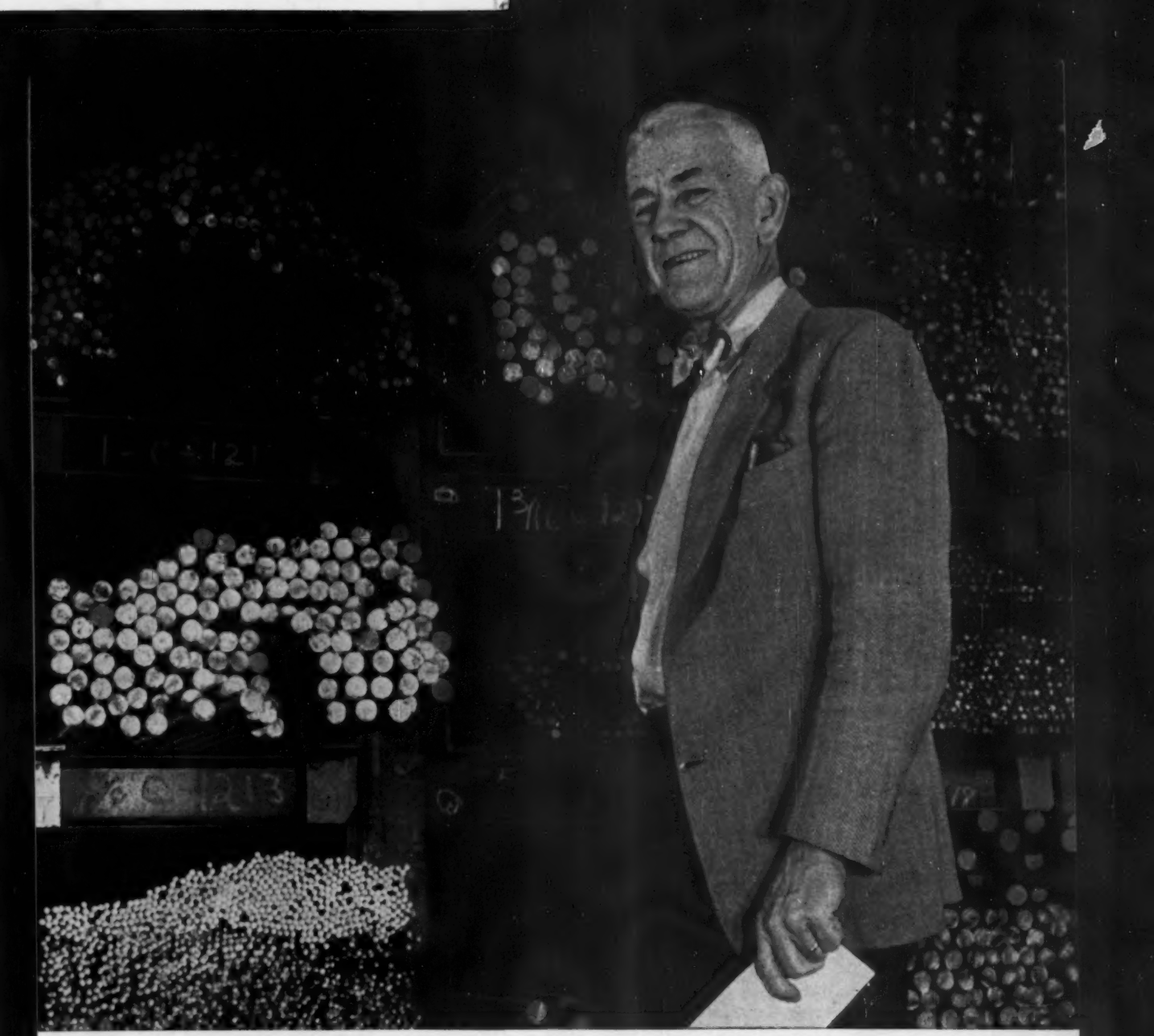
LOOK, GUYS, BIG SHOT NOW -- WORKED HERE TEN YEARS AND NEVER GOT OUT OF THE LABOR GANG.
TRYIN' TO SELL THE BOSS "BLACK STUFF" -- THE ONLY USE HE MADE OF IT HERE WAS TO SLEEP ON!
REMEMBER THE TIME DUTCH SENT HIM TO THE MACHINE SHOP FOR A TAP HOLE STRETCHER?
THAT GUY WORE OUT MORE SHOVELS LEANIN' ON 'EM THAN SHOVELIN'!
MANY THANKS TO AN ANONYMOUS CONTRIBUTOR
KUEKES

The bad penny

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO



He Runs a Supermarket Stocked with Steel

Maybe he never thought of himself in just this light, but the distributor of steel products is actually the proprietor of a supermarket. His clean, modern establishment is a "shopping center" where steel in many forms can be obtained on the spot. He displays his merchandise neatly, and any buyer is free to pick and choose. When an order comes in by phone, it is filled out of stock and is usually delivered within 24 hours.

The distributor, or warehouseman as he is often known, performs a highly valuable service. To the buyer of steel in small and moderate lots, he's a quick and reliable source of supply. He's always accessible; always easy to reach. Though able to furnish steel in substantial amounts, he also cheerfully handles orders that may yield but a few pennies profit.

In distributor stocks are such items as sheets, strip, plates, shapes, bars, tool steel, wire, hardware, wire rope, and other products you need daily. Available too are services like cutting, slitting, edging, sawing. And the distributor is an excellent source of technical advice; oftentimes he has his own laboratory for running tests.

You'll find the distributor of Bethlehem products always anxious to serve you. Look him up in your own community or one near by. He's a good man to know.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.
Bethlehem Pacific Coast Steel Corporation
San Francisco

BETHLEHEM STEEL

Call the distributor—your Shopping Center for Steel

Oct. 25, 1956—Vol. 178, No. 17

The IRON AGE

Digest of the Week in Metalworking

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NEWS DEVELOPMENTS

MAGNESIUM'S TOP MAN SAYS OUTPUT UP P. 66

J. Donald Hanawalt, general manager of Dow Chemical's magnesium dept., reports magnesium output will be up for first time since 1952. Also tells what consumers can expect in the future productwise and pricewise.

WILL TANKER PROGRAM TRIGGER CONTROLS? P. 67

If the big oil tanker program goes through, government allocation of plates and structurals may follow. Control of turbines and steam generators also is mentioned. Controls would aggravate tough market.

FARM EQUIPMENT MAKERS FIGHT BACK P. 68

Big makers of farm implements are diversifying, bringing in new products, cutting out unprofitable lines. Outlook for next year is not encouraging for hard-pressed suppliers of farm tools. But trend to more mechanized farms indicates good future.

AIR CONTROL IS EFFECTIVE BUT EXPENSIVE P. 70

Pittsburgh reports smoke control has improved over 88 pct in the past 10

years. But this has cost local industry an estimated $250 million. Nationwide expenditures this year will top last year by 20 pct.

PLYMOUTH stylists work on a clay model of the 1957 car in its early stages of development. Metalworking's stake in new car sales is outlined in this week's Special Report beginning on p. 63. How a new car is created is traced in the development of the 1957 Plymouth to production.

RESEARCH AIMS AT IMPROVING BLAST FURNACE P. 69

Reworked unit will combine high top pressure operation, steam-oxygen in blast and use of preheated blast. A 20 pct minimum increase in pig iron production from existing furnace is target of the project. High top pressure already in operation or under test on 28 furnaces.

FEATURE ARTICLES

SAVE BY KNOWING YOUR DRAWING LUBRICANT INGREDIENTS P. 103

Relying on trial and error in finding the right press-drawing lubricant can be expensive. Understanding basic lubricant types and their areas of use can help in getting the right one the first time. This article considers five principal classes of materials in detail, points out what they they contribute to various lubricant blends, and features detailed recommendations.

HOW ARE WE HANDLING INDUSTRIAL WASTE? P. 106

Metal plants, in expanding economy, are facing increasingly important problems of waste disposal. Trend toward stricter governmental regulations and plant interest in recovery of materials are factors. Based on work done in five major pollutant areas, here's a summary of what industry has learned. Discussion includes handling of solids, oils, phenols, plating wastes, and pickle liquors.

MODIFY 12 PCT CR STEELS FOR BETTER PROPERTIES P. 108

Low alloy content, high strength, good corrosion and heat resistance are reasons why 12 pct chromium steels are popular. However, as substitutes for austenitic grades they require modification. Here's a review of effects of modifications in chemistry aimed at developing new grades.

PHOTOELECTRIC CELLS DETECT SPOTWELD FLAWS P. 114

Production of high quality spotwelded assemblies progresses automatically at high speed with line inspection by photoelectric cells. With their aid, switch from riveted to spotwelded parts justifies itself in lower fabrication costs. Defective spotwelds are detected by cells focused directly on still smoking metal from only a few inches away.

DUAL FREQUENCIES DROP INDUCTION FORGING COSTS P. 116

Heating billets for forging by induction can be best bet if required flexibility, floor space, and type of operation lend themselves to it. They did at National Presto Industries' 105-mm shell plant. Six lines handle up to 480 shells each per hour. Dual-frequency arrangement prefaces 960-cycle coils with 60-cycle preheat.

MARKETS AND PRICES

GOVERNMENT MAY END NICKEL STOCKPILING P. 71

If private industry can provide the required expansion in productive capacity, the government reserve buying program may be halted by end of the year. Steel producers not too hopeful their supplies will increase. One producer estimates that 40 to 45 pct currently goes to military.

BATTERIES: COMPETITION SPURS RESEARCH P. 72

A hard fact behind the many improvements on the way for storage batteries is competition, and lots of it. The number of companies has increased 25 pct in a decade, while demand remains fairly stable. Units are getting smaller, lighter and more durable. Automotive industry takes 80 pct of the industry's total production.

RELUCTANT PENTAGON SHAVES '57 BUDGET P. 85

Political realities force military to ask for modest increase over this year. Hike of about $1.5 billion from current $31 billion budget is indicated. Raise will offset higher prices of electronic equipment and metals.

SEATTLE SEEKS NEW INDUSTRIAL LAURELS P. 87

Area's impressive growth, as reported in new manufacturing Census, seen as only a start. Value added to product almost doubled in seven year period. Metalworking and aircraft firms were important factors.

STEEL WAITS FOR AUTOMOTIVE SHOE TO DROP P. 147

Steel producers are waiting anxiously for auto companies to make the pitch they know is coming. Behind Detroit's hesitancy lie production problems and uncertainty over acceptance of the new models. Year-end scramble.

NEXT WEEK:

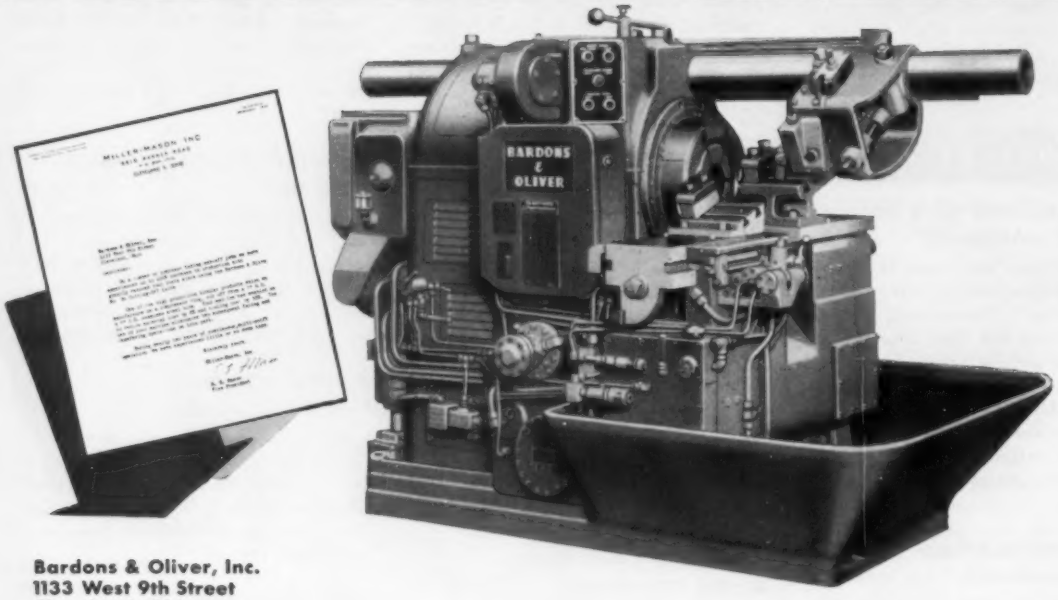
HOT-ROLLED SPECIAL SECTIONS CARRY BUILT-IN SAVINGS

Steel bars, rolled to special cross-sectional profiles, offer many potential benefits. In terms of production economy, special sections are often less expensive than standard bar stock, forgings, or castings. They may answer tricky fabrication problems.

400% Production Increase

REPORTED with BARDONS & OLIVER

CUTTING-OFF LATHE... at Miller-Mason, Inc., Cleveland, Ohio



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During nearly two years of continuous, multi-shift operation, we have experienced little or no down time.

Sincerely yours,
Miller-Mason, Inc.

R. E. Mason

R. E. Mason
Vice President

Manufacturers of a complete line of Turret Lathes and Cutting-Off Lathes.

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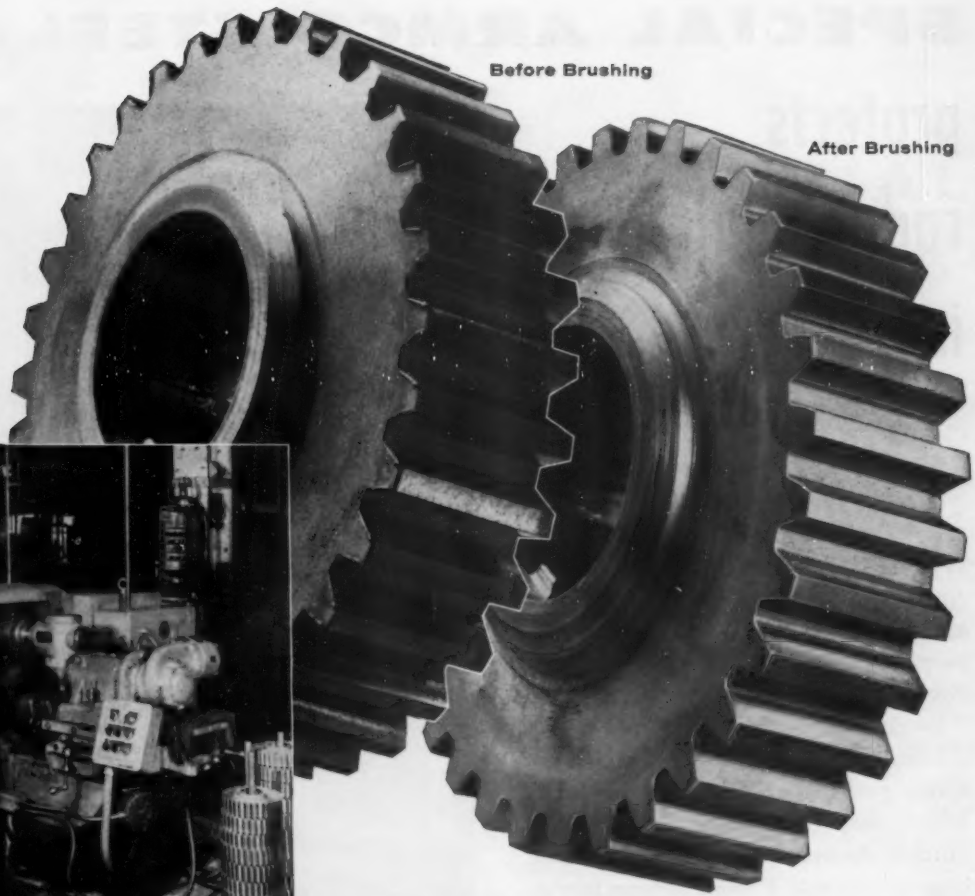

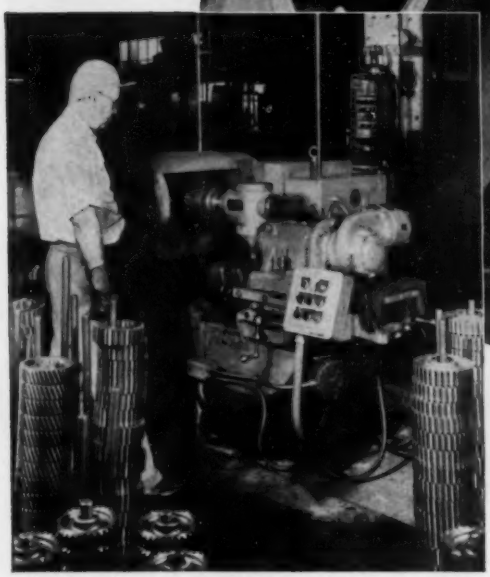

A leading machine company, supplying gears for mining and a variety of other heavy machinery, uses Osborn's Brushamatic 4 and a brushing cycle of 6 seconds a side to finish these gears in lots of 20 and up.

Pays Off...

25 for 1

REMOVING burrs from the teeth and internal spline of this gear was once a 5 minute, hand filing operation. Using Osborn Brushamatic® methods, only 12 seconds are required to remove these burrs. In addition, power brushing blends all surface junctures, reducing fracture-causing concentrations of stress.

An **O**sborn **B**rushing **A**nalysis, made in your plant and at no obligation, will show how *you* can improve quality while making similar savings in finishing time and cost. Write *The Osborn Manufacturing Company, Dept. F-51, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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Osborn Brushes

SPECIAL ARMCO STEEL protects radar equipment in Arctic

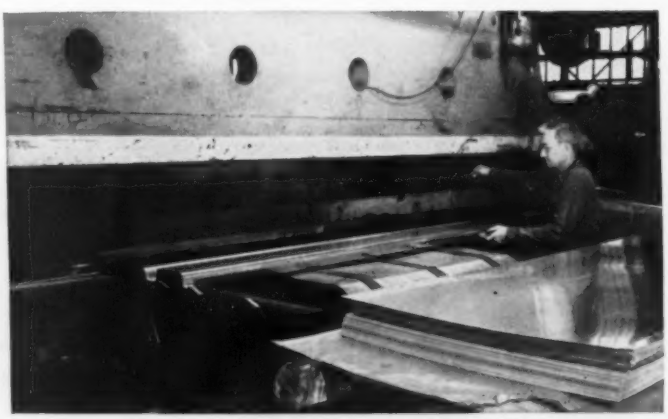
Winter is really never over in the Arctic where this radar tower and others like it stand. That's why the metal for these towers must be weather-resistant . . . the paint-on-zinc finish tight and long lasting. And that's why the tower manufacturer fabricates panels and top deck from special Armco ZINCGRIP® PAINTGRIP® Steel.

Even the severe deep-rib forming of side panels doesn't peel or flake the tightly-adhering zinc coating on this special steel. What's more, panels made from Armco ZINCGRIP PAINTGRIP Steel sheets take paint immediately, hold it longer because they're mill-Bonderized.

18-Year Record

Drawn and severely formed parts of all kinds have been made from Armco ZINCGRIP PAINTGRIP for more than 18 years. It was the *first* hot-dip zinc coated steel sheet that could be severely formed or drawn, then painted without pre-treatment.

Men and costly equipment are housed in this compact Arctic radar tower. About six tons of Armco ZINCGRIP PAINTGRIP Steel sheets are in each 50-foot diameter tower. (Tower fabricated by Dresser-Ideco Company, Columbus, Ohio, one of the Dresser Industries. Radar equipment shown was developed by the Heavy Military Electronic Equipment Department, General Electric Company, Syracuse, N.Y.)



Two-inch by two-inch corrugations are formed in Armco ZINCGRIP PAINTGRIP Steel sheets with no damage to the zinc coating. These side panels are painted before erection. No pre-treatment is needed before painting.

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Indexed in the Industrial Arts Index and the Engineering Index.

EPA NBP

October 25, 1956

EDITORIAL

Whether You Like It or Not . . .

◆ THIS IS STILL a free country. You can believe anything you care to. You can argue about it, fight about it and contribute to causes that help it. But that doesn't make it true. And it doesn't always make people believe as you do.

Today we are fighting out the question of too much credit. Sincere people are proving by accepted methods that we are in the tight grip of inflation. Others warn that without spending we cannot carry the load of public and private commitments; that we can't progress.

As a warning signal many are pointing to inflation as it hit Germany years ago. In another group the speaker will refer to the WPA leaf-raking squad. Still others dwell more realistically on the catastrophe of the '30's.

Most of this recall is true—to the one doing the recall. The '30's were bad for those who had no jobs and pounded the sidewalks weeks or months on end looking for work.

It is true—though today it sounds unbelievable—that a 1932 report: "the steel ingot rate bounded up two points to 18 pct of capacity this week" was not unusual. It is true too that the average steelworker—if he was working at all in 1932—made about $650 that year. It is true that steel executives and other supervisors "took" a 60 pct pay cut.

Now that we have said this—and there were sadder pictures by the thousands—what have we accomplished? We have tried to indicate that if we don't do thus and so we will have a repeat performance. Maybe we will. But there is a part of the picture some of us older ones don't always see.

This world is not in our hands—completely. Soon those who were 10 and 15 years old in 1930 will be taking over. Their recall is not ours. They will learn the hard way, as we did.

We can advise, cajole and plead, but we can't get far by commanding. There are today millions of engineers, supervisors, skilled workers, drones, hard workers and lounge lizards who never had it so good—according to us.

Their outlook is a way of life. When you "warn," use a calm and quiet voice—it will get you further with someone who was 10 or 15 years old in 1930; or maybe was born that year.

Tom Campbell

EDITOR-IN-CHIEF

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dear editor:

letters from readers

Old Phrase

Sir:

I am writing in reference to the use of the phrase "figure jugglers" in reference to statisticians in your issue of Sept. 20, p. 73.

This isn't a particularly new phrase. In fact the first time I heard it I thought it was appropriate to the situation and I was mildly amused. I was shocked by your use of this expression because of the violence it did to my general impression formed through years of experience with THE IRON AGE as a source of valuable and reliable statistical information.

You evidently are not in agreement with the intent of the conference that you report, and I fairly concede your right to express this disagreement. I think you could have selected words more in keeping with the dignity of THE IRON AGE. *F. G. Norris, Metallurgical Engineer, Wheeling Steel Corp., Steubenville, Ohio.*

No offense meant. We simply can't get along without statisticians.—Ed.

New Test

Sir:

In the August 30, 1956 issue of THE IRON AGE, you carry an article by Messrs. A. E. Gerds and C. W. Melton titled "New Etch Spots Leaded Steels."

This article is of particular interest to us, and we want to make it available to metallurgists and others at our various plants. May we have your permission to make photostatic copies of this article? It will be used for distribution only within our own organization and for reference purposes. *E. C. Mueller, Metallurgical Dept., American Steel & Wire Div., U. S. Steel Corp., Cleveland, Ohio.*

Permission granted.—Ed.

Big Asset

Sir:

Your "Cleveland" article, p. 163 in the Sept. 27 issue of THE IRON AGE is very informative.

However, one asset this great city can boast of was not mentioned: Cleveland is the home of many important gear manufacturers—in fact, one of them is the world's largest exclusive producer of worm gears and worm gear reducers. *J. C. Sears, Exec. Secy., American Gear Manufacturers Assn., Washington, D. C.*

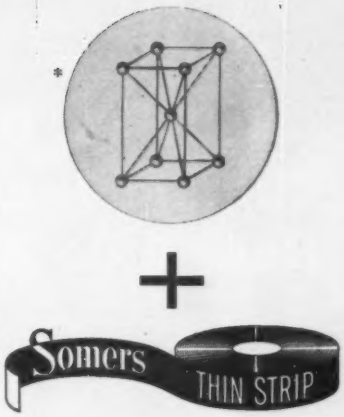
Inside Story

Sir:

The article entitled "The Real Issues Behind Taft-Hartley," p. 51 of Oct. 4 issue of THE IRON AGE, is very informative and interesting. We note that reprints are available as long as the supply lasts. We would like to have four or five copies of these reprints. *W. R. Guest, Exec. Vice President, The Ingalls Shipbuilding Corp., Pascagoula, Miss.*

THE IRON AGE

"That does it, Dick!"



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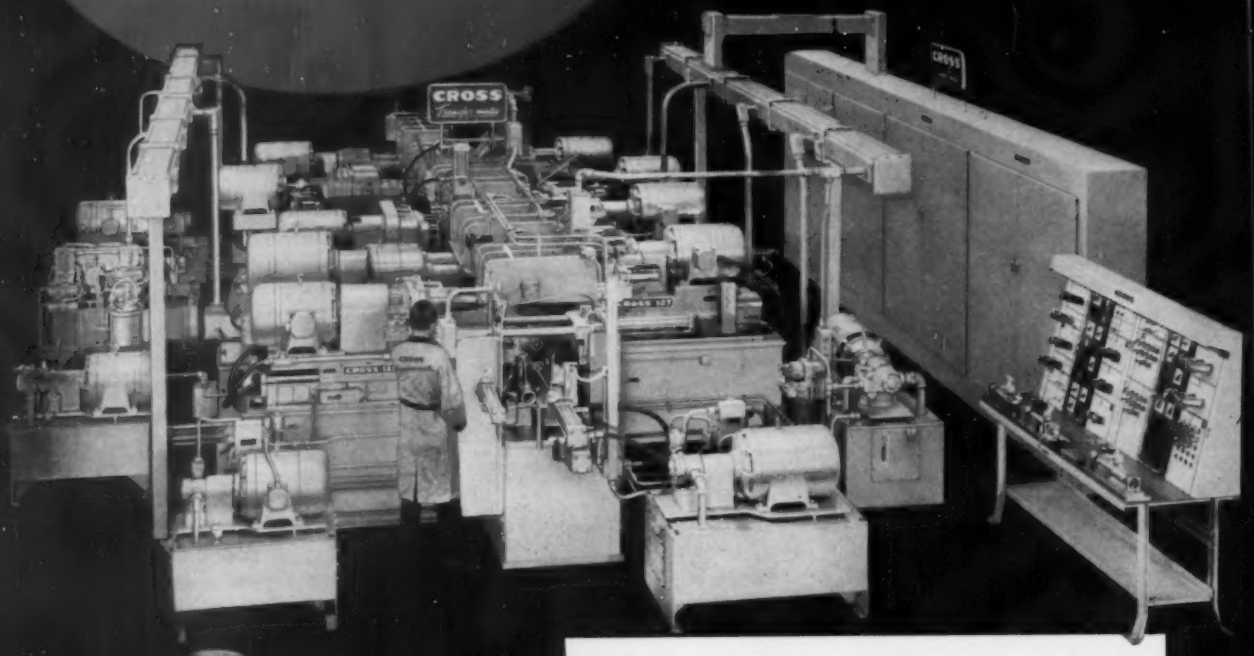

- ★ Rough and finish bores two tube holes; rough and semi-finish bores differential case bearing seats; rough and semi-finishes pinion shaft bore; drills, chamfers and taps ten cover screw holes.
- ★ 75 pieces per hour at 100% efficiency.
- ★ Twenty-two stations: one for loading, one for unloading, four for boring, two for back-boring, two for drilling, one for tapping, one for turn-over and ten for inspection.
- ★ Lift and carry transfer mechanism.
- ★ Cross Modular Unit Construction provides flexibility for part design changes.
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fatigue cracks

Bang-Up Job

When a company comes along with something like a brand new nail it's the sort of thing the sales-manager tells the publicity man he wants action on. Nothing romantic, just action. When Jones & Laughlin secured U. S. manufacturing rights to a spiral nail from Steel Co. of Canada, J & L's PR man, John Paulus was in just that spot. Can't you hear Clarence Kendall, who manages wire products for J & L, telling Paulus, "Let's put this over with a bang, John" (You can't? Ok, so you can't).

At any rate John thought about how the nails hold tighter, drive easier, don't split the wood as easily and withal, cost less. So instead of just sending us a note to that effect he sent along a little box of the new Ardox nails, a box of standard nails, a hunk of white pine and a great big full sized hammer. "If you don't believe me, try it yourself," said the note from J. Paulus.

Two smashed fingers, one dented desk and 10 minutes later the editorial guinea pigs turned the hammer over to Art Director Degen, who lives in an apartment overlooking a lake and so never had a hammer.

Looking Backward

What with everybody looking forward we are occasionally prompted to look backward. Not that we prefer being persnickety, but looking backward now and then can be rewarding—as any fellow who has just passed a pretty girl can tell you.

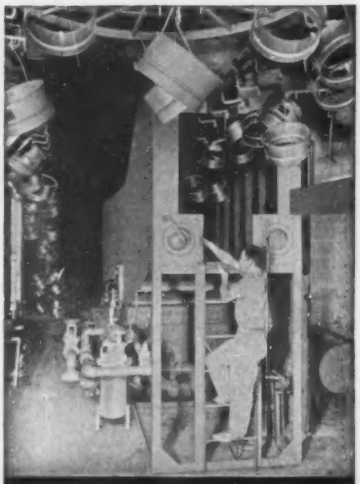
The editors had so many nice comments on two recent articles on oxygen steelmaking that we got to checking old files to see when the thing started. We were pleased to discover that your f.f.j. has been systematically covering the oxygen steelmaking situation since away back in 1947. Matter of fact, the latest authoritative book on the subject ("Oxygen in Iron and Steel Making; Charles, Chater and Harrison; Butterworth, London, 1956) is dotted with references to our earlier efforts in reporting the developments as they developed.

One of the more significant references was to the first major technical article in the U. S. on oxygen steelmaking at the Linz plant in Austria. At that time (1953) the Linz 30-ton oxygen converter was turning out 300 tons more than the output of a 200-ton openhearth in a 24-hr period. This, as many readers now know, marked the beginning of a trend.

Oxygen used in openhearth.

Puzzlers

The August 30 puzzler about the crossed belt for pulleys, probably originally proposed by that crazy, mixed-up Euclid posed no problem for C. M. Houston, Moody Engineering Co.; Don Hartman, Solar Steel Corp.; W. C. Cooledge; Gilbert King, National Research Corp.; John Homer, Jr., James Young and Henry Buresh, Collins Radio Co.; Edward F. Moore, Mercury Div., Ford Motor Co.; Jack Clynes and Mrs. B. Sever, General Cable Corp.; and C. W. McKinley. Answer? 22.9586 ft.



...new Cincinnati
Finishing System
at NuTone

This automatic painting and baking system, designed by CINCINNATI for NuTone, Inc., world-famous manufacturer of door chimes, ventilating fans and kitchen hoods, has increased production, sharply slashed finishing costs and doubled capacity per square foot area. Paint consumption is reduced to from 35 to 50% of what was formerly required.

Add to this a substantial increase in production, and you realize the higher efficiency NuTone has achieved, while saving more than $900 per week!

Let a CINCINNATI Cleaning and Finishing engineer take a look at your finishing costs. He'll give you a no-obligation analysis that can point to real savings for you.

Write today!

Cincinnati
THE CINCINNATI CLEANING AND FINISHING MACHINERY COMPANY
[illegible] Hagaman St., Sharonville, Ohio, U.S.A.

This Cincinnati Bickford Super Service Radial Drill effects substantial cost savings in general applications. Drilling, tapping and setting fifty 1½" diameter studs on this turbo casing, shown above, is done in 185 minutes now as against 242 previously.

The York Corporation tells us that simplified, centralized controls, ease of machine positioning and minimum operator fatigue are important factors in these cost savings.

Write for bulletin covering these Cincinnati Bickford Super Service Radials.

Illustration courtesy of the York Corporation, York, Pa.

CINCINNATI BICKFORD

SUPER C·B SERVICE

RADIAL AND UPRIGHT DRILLING MACHINES

CINCINNATI BICKFORD DIVISION

GIDDINGS & LEWIS MACHINE TOOL COMPANY

OAKLEY, CINCINNATI 9, OHIO, U.S.A.

dates to remember

OCTOBER

American Gear Manufacturers Assn.—Semi-annual meeting, Oct. 27-31, Edgewater Beach Hotel, Chicago. Assn. headquarters, One Thomas Circle, Washington, D. C.

American Institute of Steel Construction, Inc.—Annual convention, Oct. 28-Nov. 1, The Greenbrier Hotel White Sulphur Springs, W. Va. Society headquarters, 101 Park Ave., New York.

The Wire Assn.—Annual convention, Oct. 29-Nov. 1, Penn-Sheraton Hotel, Pittsburgh. Assn. headquarters, 453 Main St., Stamford, Conn.

Truck Body and Equipment Assn., Inc.—Convention and exhibit, Oct. 29-31, Sherman Hotel, Chicago. Society headquarters, 1616 K St., N.W., Washington 6, D. C.

EXPOSITIONS

Society of Industrial Packaging and Materials Handling Engineers—Oct. 28-31, Atlantic City, N. J.

Third International Automation Exposition—Nov. 26-30, New York.

Gray Iron Founders Society, Inc.—Annual meeting, Oct. 30-Nov. 2, The Homestead, Hot Springs, Va. Society headquarters, 930 Nat. City-E 6th Bldg., Cleveland.

NOVEMBER

Society of Automotive Engineers, Inc.—National diesel engine meeting, Nov. 1-2, The Drake, Chicago. Society headquarters, 29 W. 39th St., New York.

Instrument Society of America—Symposium, Nov. 7-8, Bellevue-Stratford Hotel, Philadelphia. Society headquarters, 1319 Allegheny Ave., Pittsburgh.

Porcelain Enamel Institute—18th annual shop practice forum, Nov. 7-9, University of Illinois, Urbana, Ill. Society headquarters, Associations Bldg., 1145 Nineteenth St., N.W. Washington, D. C.

National Electrical Manufacturers Assn.—Annual meeting, Nov. 12-16, Traymore Hotel, Atlantic City, N. J. Society headquarters, 155 E. 44th St., New York.

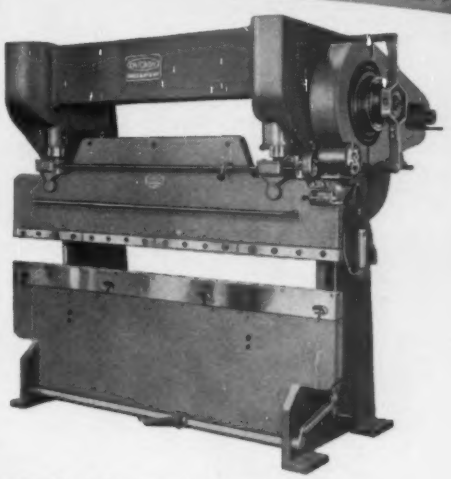
Investment Casting Institute—Annual meeting, Nov. 13-15, Sheraton-Cadillac Hotel, Detroit. Society headquarters, 27 E. Monroe St., Chicago 3, Ill.

National Assn. of Waste Material Dealers, Inc.—Fall meeting, Nov. 15-19, Hollywood Beach Hotel, Hollywood, Fla. Society headquarters, 271 Madison Ave., New York.

The American Society of Mechanical Engineers—Annual meeting, Nov. 25-30, Statler Hotel, New York. Society headquarters, 20 W. 39th St., New York.

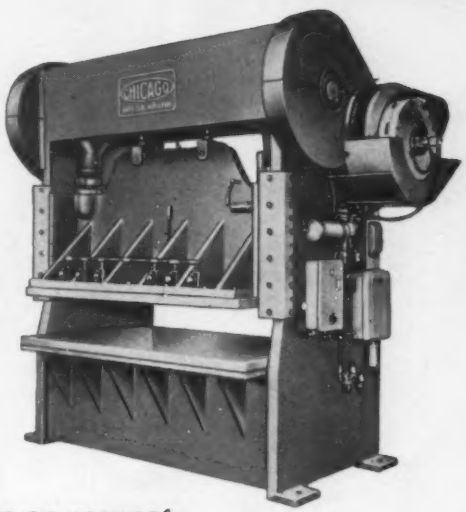
Wire Reinforcement Institute, Inc.—Fall meeting, Nov. 26-27, The Jung Hotel, New Orleans, La. Society headquarters, National Press Bldg., Washington 4, D. C.

FASTER
Sheet Metal Operations



Beading
Bending
Blanking
Corrugating
Curling
Drawing
Forming
Joggling
Multiple Punching
Trimming

CHICAGO Press Brakes
Five Models for Sheet Metal Work
11, 30, 36, 50, and 60
Ton Capacities



CHICAGO Straight-Side and Gap Presses with Large Die Area for blanking, punching, trimming, and shallow drawing. Custom built to individual requirements in stroke, die space, and bed area.

Descriptive Literature on request

6181

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Press Brakes • Straight-Side Presses • Press Brake Dies
Hand and Power Brakes • Special Metal-Forming Machines

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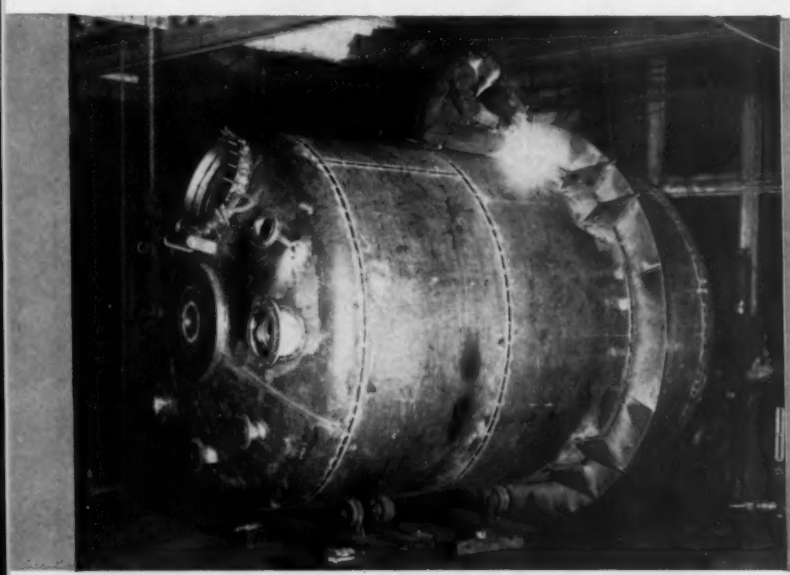
MANUFACTURING CO.
7430 South Loomis Boulevard, Chicago 36, Illinois

CF&I LECTRO-CLAD*

AN INSIDE JOB—Welding on the inner, Lectro-Clad surface of a caustic evaporator. Regular manual arc welding with Inco "141" nickel electrodes preserves the continuity of the nickel plating. Prior to welding the nickel side, the plate edges are prepared by flame cutting and bevelling, welding is completed on the steel side, and the nickel is back chipped to sound steel weld metal.

reduces delivery time by one year

—New Jersey fabricator uses CF&I NICKEL PLATED STEEL PLATES for caustic evaporator



A welder at the L. Lawrence Company puts the finishing touches on an 8-foot diameter caustic evaporator. Heads and plates are all fabricated from CF&I Lectro-Clad, nickel plated on all inside surfaces for protection against contamination. Rolling, shearing and severe forming of Lectro-Clad are easily accomplished, using normal steel fabricating methods — the nickel plating *will not* check, spall or flake.

■ Instead of waiting a year for hard-to-get, expensive nickel, the L. Lawrence Company, Inc., of Newark, New Jersey used ⅜-inch steel plates with a .015-inch, Lectro-Clad nickel plating in making a caustic evaporator for a large chemical company. Results—a completely successful evaporator . . . *at lower cost . . . delivered a year sooner than expected . . . fabricated with standard procedures.*

The Lectro-Clad nickel plating on the inside surface of the evaporator does the same job as solid nickel or nickel-clad steel in protecting against discoloration and contamination . . . the carbon steel plates give structural strength and durability. What's more, you can expect plate delivery in six weeks when you order CF&I Lectro-Clad.

If you use, or fabricate, heavy industrial equipment where product contamination is a problem, you can probably use CF&I Lectro-Clad to good advantage. For further details, write for the Lectro-Clad Technical Manual, Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P. O. Box 1951, Wilmington, Delaware. 4372

***NICKEL PLATED BY THE BART LECTRO-CLAD PROCESS**

Claymont Steel Products

CF&I

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver • Detroit • El Paso • Ft. Worth
Houston • Lincoln • Los Angeles • New Orleans • New York • Oakland • Odessa • Oklahoma City • Philadelphia • Phoenix • Portland (Ore.
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CF&I OFFICES IN CANADA: Toronto • Montreal
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OTHER CLAYMONT PRODUCTS

Stainless-Clad Plates • Manhole Fittings and Covers • Large Diameter Welded Steel Pipe • Fabricated Steel Parts • Flanged and Dished Heads • Alloy Steel Plates • High Strength Low Alloy Steel Plates

THIS MAN KNOWS

... All about the high quality raw materials, the close control, the painstaking care that go into the production of Vancoram Vanadium Products. He helps produce them.

50 years of experience stand behind him!

Versatile Vanadium can do almost any job expected of an alloy.

It is used for example in constructional, cutlery and alloy tool steels, in High Speed steels, in heat resisting and stainless steels, in rimmed steels, in large forgings and steel castings.

Vancoram Vanadium has wide usage also in cast irons.

For details on the application of Vanadium products call your nearest Vancoram District Office. Our Technical Service Representatives will be happy to discuss your problem and offer recommendations.

Vancoram Vanadium Products for Steel and Iron.

Ferrovanadium	Vanadium Pentoxide
Vanadium Metal	Vanadium Grainal #1

There's always that extra margin of quality in the Vancoram Green Drum

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TORRINGTON CUSTOM-MADE BEARINGS

"This Torrington design solves my bearing problem!"

Time and again, industrial firms with special bearing requirements turn their assignments over to Torrington—specialists in designing and building custom bearings.

This confidence has been won by years of successful experience. When you call on Torrington, you engage engineers who have devoted tens of thousands of hours to the design and construction of virtually every type of bearing. From their experience—and imagination—comes the *special* bearing that will bring you peak efficiency, service life and economy.

For a custom *or* standard bearing—any size, any type—you can rely on the skill and experience of Torrington.

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TORRINGTON BEARINGS

Spherical Roller • Tapered Roller • Cylindrical Roller
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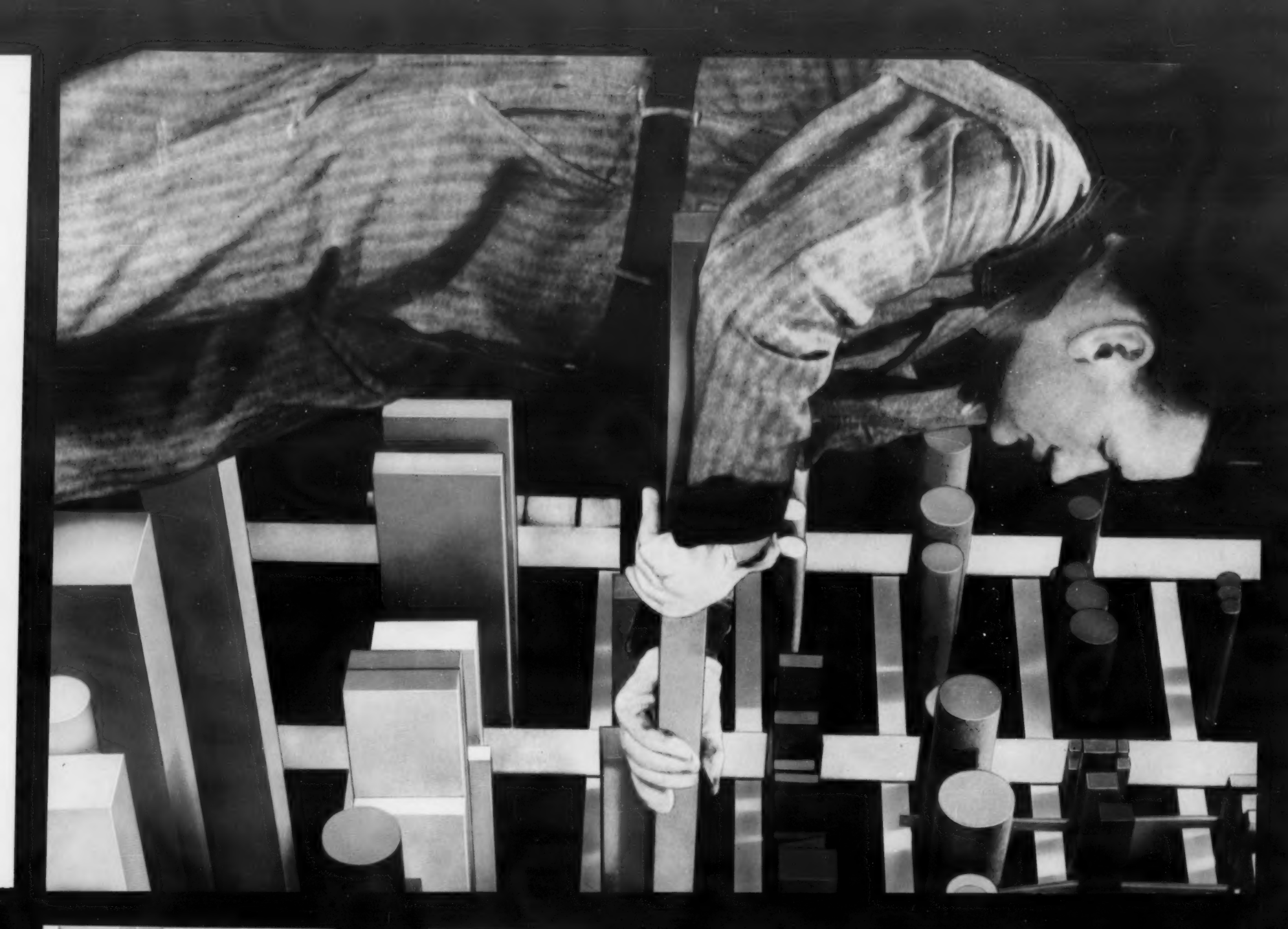


Take this *new look* at what you get when you call *Carpenter*

There are many reasons why it isn't profitable to carry too large a stock of specialty steels in your shop. Perhaps excessive *manpower* is tied up in handling large inventories . . . maybe you are trying to free *dollars* for more productive use . . . or cut down on worrisome *paper work*. If any of these is a problem, there is a way out!

But it hinges on the *ability* of your steel supplier to meet your day-to-day specialty steel needs, quickly and without hesitation.

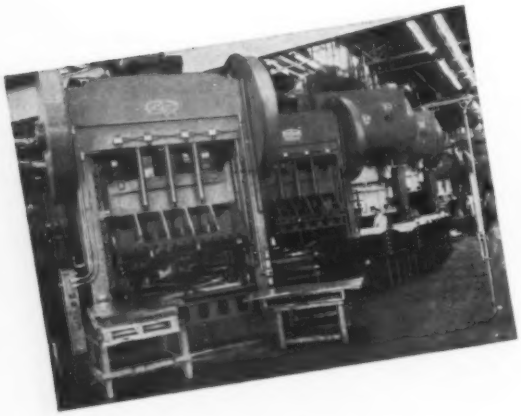
For example, here's how Carpenter is doing everything possible to help you: We've gone all out in building up ample stocks of tool, stainless, and alloy steels. You can expect the closest kind of cooperation from your Carpenter representative . . . as well as the order desk people, warehouse crew, and the office staff. All with the idea of working with you to *hold down* specialty steel costs and improve your results. Call your nearest Carpenter Mill-Branch Warehouse, Office or Distributor, any time. The Carpenter Steel Company, Dept. 221, Reading, Pa.

Carpenter STEEL

Mill-Branch Warehouse Service

Mill-Branch Warehouses, Offices and Distributors in Principal U.S. Cities

new CLEVELAND Presses give you better stampings for less.



Chances are that your production lines are operating at full capacity. That's why it's most important to carefully check your present Press equipment. Worn, inefficient Presses are wasting your profits.

In the ever widening field of pressed metal products, new Cleveland Presses are used to advantage by cost conscious manufacturers. They've found their investment in new Presses is soon repaid by more accurate, dependable and economical production.

Whether you need one press or a complete battery, you'll find there's just the right Cleveland Press to keep your company in a competitive, profitable position; Cleveland Presses are built in a complete range of types and sizes, from small Open Back Inclinables to large Underdrives. All offer outstanding efficiency.

Whatever your needs may be, "why settle for less than a Cleveland Press." Be sure to get complete information on the (patented) Cleveland Drum Type Air Friction Clutch with spring loaded brake. It reduces down-time. Write or call today.

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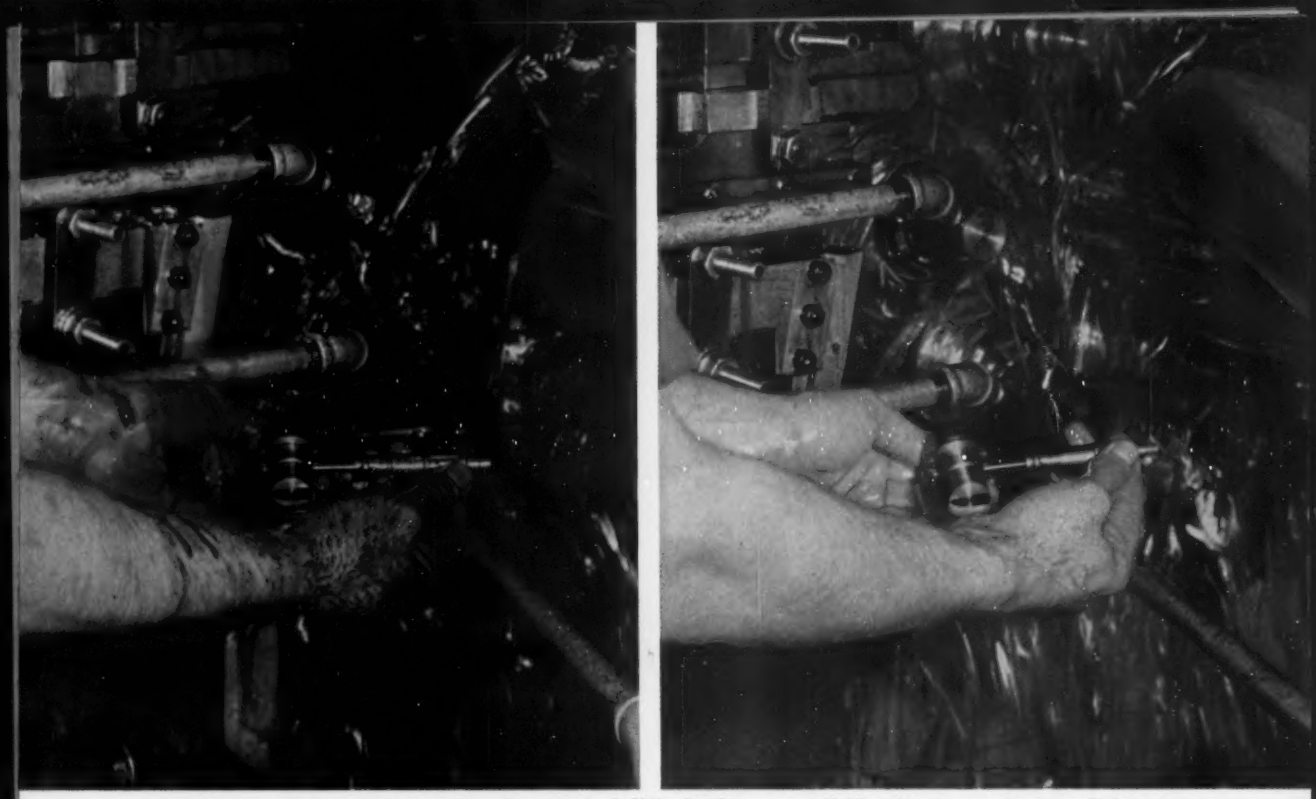

Black cutting oil (left) makes close control difficult. Operators dislike dirty operating conditions it creates. Close control is easier and workers are happier with transparent Sunicut cutting oil (right).

WHY USE A BLACK CUTTING OIL WHEN YOU DON'T NEED IT?

Sunicut oils give you better visibility without sacrificing machining efficiency.

When trying to maintain close control over machines producing precision parts, operators can be handicapped by "black-oil blindness". It is hard to see the tools, the workpiece, and the finishes. Checking close tolerances is difficult when the graduations on micrometers and gauges are obscured.

Worse still, as the operator sees it, are the dirty working conditions caused by dark oils. His clothes get saturated with hard-to-remove stains, and his hands are black from one end of the shift to the other.

Transparent Sunicut oils help keep your operators happy and will make close control easier ...and transparent Sunicut oils will do the job with no sacrifice in machining speed or finishes.

To get the full story on Sunicut oils, see your local Sun representative, or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-41.

SUNOCO

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY PHILADELPHIA 3, PA.

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IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL

For any machining or grinding operation...

THERE'S A SUN OIL THAT'LL GIVE YOU HIGH EFFICIENCY AND LOW OVER-ALL COST

No two machine shops have exactly the same problems when it comes to selecting cutting oils...even when they're running the same job. And, until somebody comes up with the truly universal cutting oil, you can't afford to disregard the importance of oil selection. Here's how Sun can help you.

First, Sun makes a complete line of emulsifying and straight cutting and grinding oils. Second, your Sun representative, backed up by field engineers, has the necessary practical experience to recommend the oil that will give you both high machining efficiency and low over-all costs.

For the full story about Sun's cutting oils, see your Sun representative...or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-42.

SUNOCO

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY PHILADELPHIA 3, PA.

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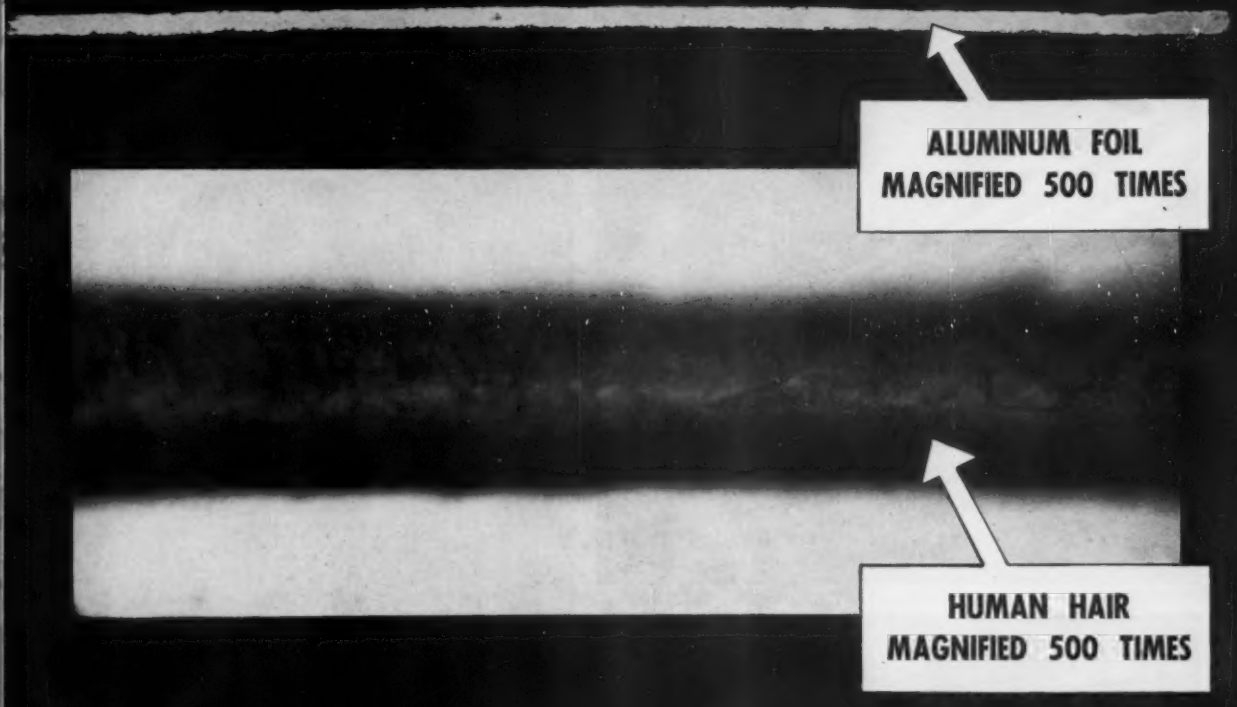


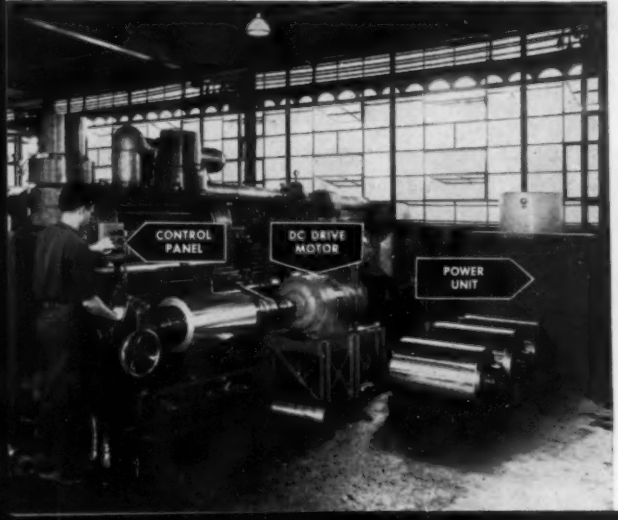
General Electric d-c drives help

Roll aluminum 1/10 the thickness of human hair

A GENTLE TOUCH—Rolling high-quality aluminum to 1/10 the thickness of a human hair takes a gentle touch. Doing it 24 hours a day, six days a week demands sturdy, reliable equipment. To obtain this combination of sensitivity and dependability Republic Foil and Metal Mills, Danbury, Conn., has installed five General Electric Speed Variators on their pay-off drives.

REDUCED DOWN-TIME—Mr. James D. Post, Vice President in Charge of Operations, reports, "The General Electric Speed Variators provide more constant tension and steady acceleration. As a result, down-time and maintenance have been reduced on this delicate work. We also like the way they stand-up under continuous operation. Our satisfaction is manifest in a duplicate order for our No. 5 mill."

THREE COMPONENTS of G.E.'s Speed Variator are shown installed on the pay-off drive at Republic Foil and Metal Mills.

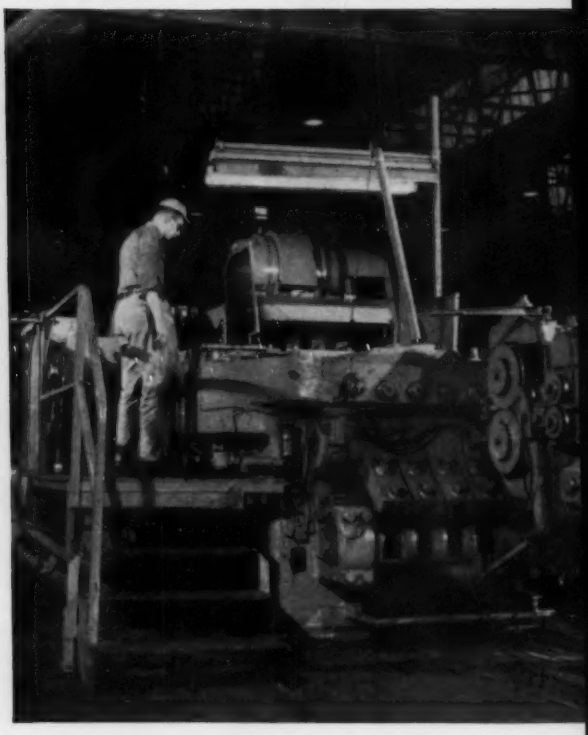


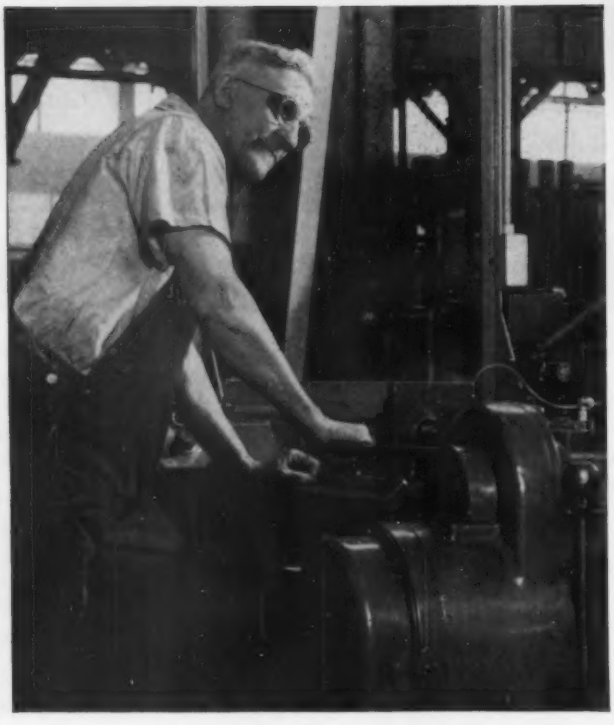
SPLIT-SECOND RESPONSE—General Electric Speed Variators are proving the answer to a variety of difficult metal rolling and slitting applications in brass, aluminum, and steel. Providing smooth, steady acceleration and split-second response to control signals, they can meet the most exacting drive requirements.

ENGINEERED TO YOUR SPECIAL NEEDS—The Speed Variator conversion unit comes assembled, wired and tested... ready to be installed on your a-c system. General Electric engineers will be glad to help you in making the most effective use of these drives. Please call your G-E Apparatus Sales Office or write for bulletin GEA-6127. *Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania.* 820-2

Progress Is Our Most Important Product

GENERAL ELECTRIC





COORDINATED PRODUCTION safeguards material quality from ore mine to steel billets delivered to our Bolt and Chain Division fastener plant as shown at top, left. This complete metallurgical control makes certain that each fastener type is made from the analysis best suited to meet final application requirements.

MODERN FACILITIES mean absolute uniformity throughout any given type and size fastener, in any quantity, every time. This rigid adherence to standards is the backbone of dependable performance. Photo, top, right, shows one of a battery of automatic high-speed, heavy-duty nut formers.

VAST EXPERIENCE extending over a century of fastener manufacture backs every Republic fastener produced. This know-how, accumulated and passed on by skilled craftsmen and designers has evolved 20,000 standard and 8,000 special types and sizes, currently available to meet your requirements.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

The case for
FASTENER SELECTION

3-Way Quality Control assures maximum performance fasteners

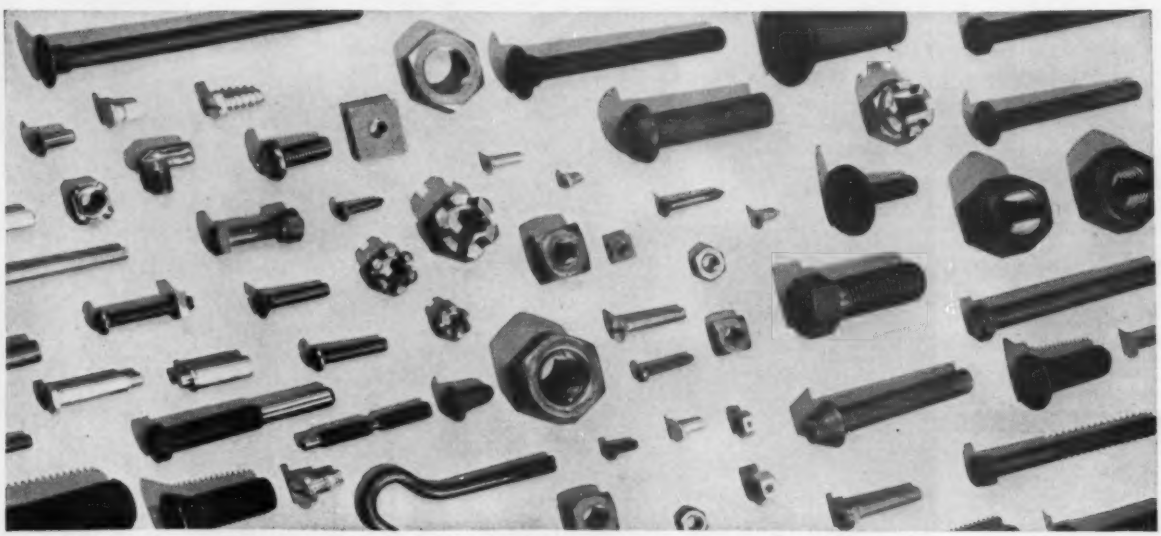
It's a fact: Performance is a direct function of quality. And in fastener application, where everything depends on holding power, you owe it to your product and reputation to specify the best—Republic Bolts and Nuts.

Republic's reputation for reliability is based on precise control of quality, from raw ore to finished fastener product. As a basic producer of steel, we can specify and produce the exact grade of alloy or carbon steel to assure maximum performance in the fasteners it will form.

Beyond outstanding material quality, Republic fasteners are absolutely uniform throughout any given type and size. Batteries of modern machines, double checked by comprehensive testing procedures, maintain exacting standards regardless of production quantity.

Finally, to the finest materials and methods, Republic adds priceless experience in fastener manufacture. Each of our 20,000 standard plus 8,000 special types and sizes is produced by skilled operators drawing on a fund of "know-how" over a century in depth. This same reservoir of experience enables Republic to undertake volume production of headed and threaded items made to your own particular specifications.

Whatever your requirements, maximum performance Republic fasteners will give your assemblies the protection they deserve at no more cost than other brands. So don't just order fasteners, *select* Republic and be sure of the best. Contact your local Republic sales office, or mail the coupon for full information.



MAXIMUM PERFORMANCE FASTENERS are the logical result of Republic's quality protected materials, precision manufacturing equipment and time-tested methods. In addition, these factors make Republic your best choice for volume production of highly specialized headed or threaded items, made to your exact specifications.

STEEL
and Steel Products

REPUBLIC STEEL CORPORATION
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Please send me complete information on Republic Fastener Products.

Name_____ Title_____

Company_____

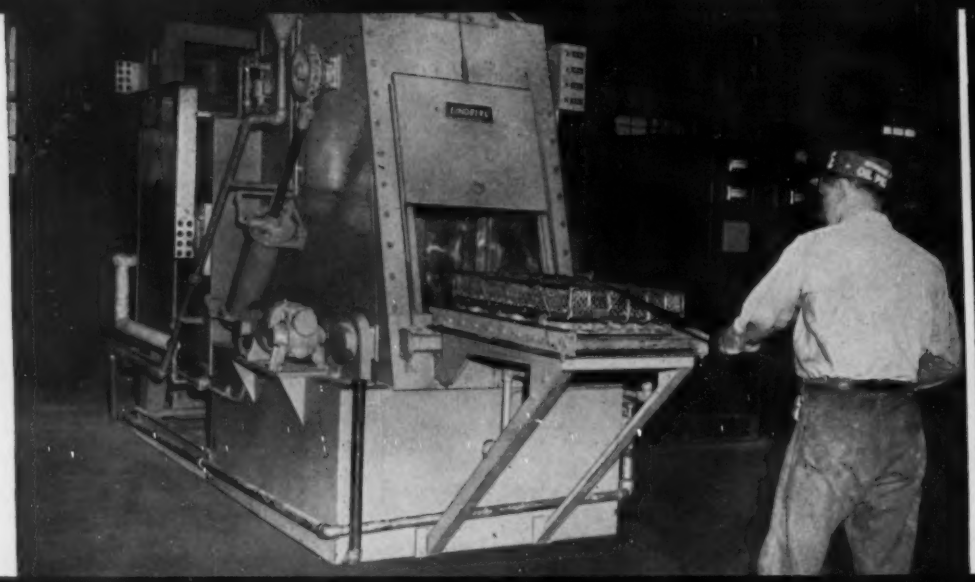
Address_____

City_____ Zone____ State_____

C-2257

ALLIED

New Lindberg electric furnace with CORRTHERM element at Allied Metal Treating Corporation, Kenosha, Wisconsin. This furnace is used 24 hours a day, 6 days a week, for carbonitriding, clean hardening pinion gears, hardening crank shafts after carburizing and carburizing small gears and shafts.

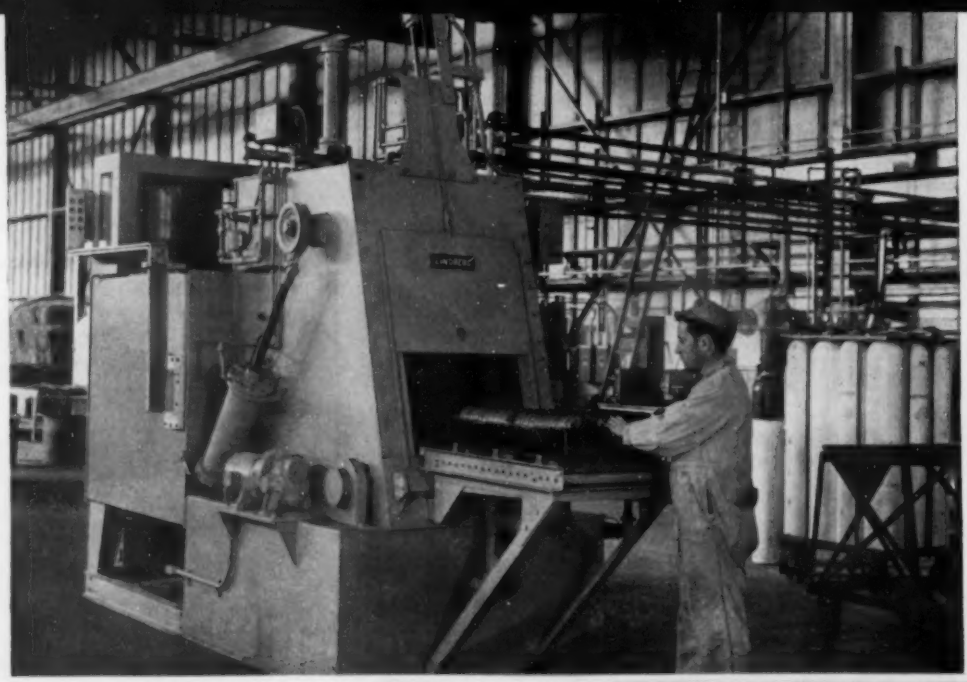


EKLUND

Installation of new Lindberg furnace with CORRTHERM electric element at Eklund Metal Treating, Inc., Rockford, Illinois. Furnace used 24 hours a day, 7 days a week, for carburizing gears and machine tool parts, carbonitriding sheet metal screws and automotive parts, and hardening and tempering bolts.

PERFECTION

Lindberg electric furnace with CORRTHERM element just installed at Perfection Tool & Metal Heat Treating Company's Lombard, Illinois plant. This furnace is being used 24 hours a day, 6 days a week, for carbonitriding and carburizing parts for automotive and farm implement industries.



COMMERCIAL HEAT-TREATERS QUICK TO ADOPT LINDBERG ELECTRIC CARBONITRIDING FURNACES WITH NEW CORRTHERM HEATING ELEMENT

It is significant that commercial heat-treaters, always in the lead in the acceptance and development of better heat-treating methods, have been among the first to appreciate the revolutionary advantages of Lindberg's newly announced CORRTHERM electric heating element.

Recent Lindberg CORRTHERM-equipped furnace installations in plants of three leading midwestern commercial heat-treaters are shown on the opposite page.

Where electricity is the preferred source of heat Lindberg furnaces with CORRTHERM provide to the fullest degree the versatility and dependability required in efficient commercial heat-treating. Ideal for carbonitriding, they are readily applicable to other processes—carburizing, carbon restoration, bright hardening or annealing, and normalizing.

Whether your heat-treating operations are commercial or captive, large or small, the CORRTHERM element in Lindberg electric furnaces offers you these exclusive advantages:

Low voltage—operates at extremely low voltage. No leakage through carbon saturation.

Atmosphere Circulation—elements act as baffle to direct circulation of convection streams.

Safety—extremely low voltage eliminates shock or short hazards.

Durability—watts density at all time low. Element practically indestructible.

This shows how the new Lindberg CORRTHERM electric heating element fills the furnace with walls of glowing heat. Note also that CORRTHERM is conveniently hung from simple brackets requiring no complicated connections or construction.

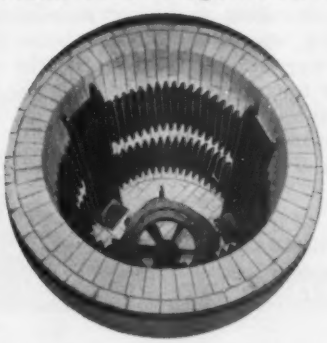
CORRTHERM is an exclusive Lindberg development created in Lindberg laboratories by Lindberg metallurgists and engineers. To find out how its advantages can be applied to your heat-treating processes consult your nearest Lindberg Field Representative. (Look in classified phone book.)

LINDBERG ENGINEERING COMPANY

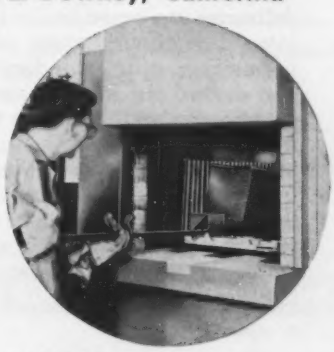
2452 West Hubbard Street, Chicago 12, Illinois

Los Angeles Plant: 11937 Regentview Ave., at Downey, California

Installation of CORRTHERM elements in one of two large rotary furnaces just erected in the field by Lindberg's associate company, Lindberg Industrial Corporation.



Installation of Lindberg CORRTHERM-equipped carburizing pit-type furnace in plant of Lindberg Steel Treating Co., Melrose Park, Ill.



Safety! Extremely low voltage makes CORRTHERM elements completely safe. Let operator or work load bang it if they will. Neither element nor operator will be hurt.

They may seem the same, but...

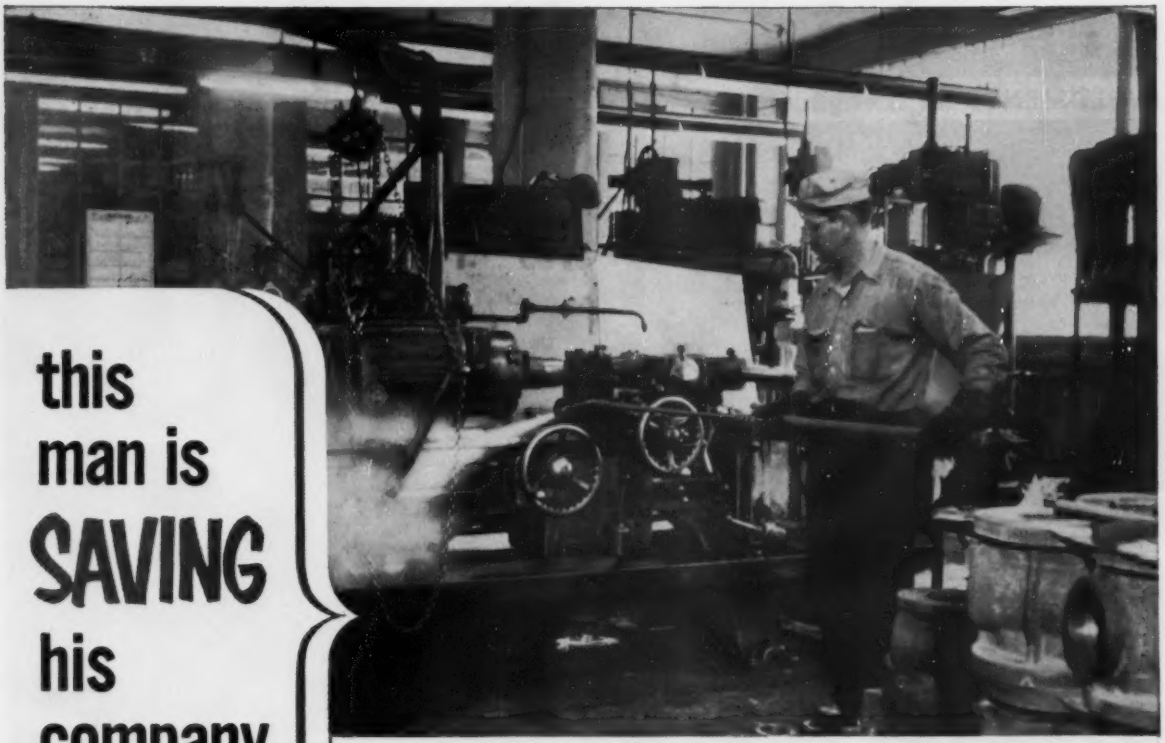
American is the name!

Your actual fastening costs include four basic items:
1. Price • 2. Service • 3. Quality • 4. Research • From time to time, you may find local price differentials that seem worthwhile to you. But no-one gives you more of all four than American. • *American gives you more of all four . . . in service,* where American precision deliveries are keyed to the most demanding production schedules, from single-case to car-load lots . . . *in quality,* where production tools are made to extremely close tolerances that exceed normally accepted standards . . . *in research* that developed the original Phillips fastener and showed one manufacturer how to convert a milled-from-the-bar special to a mass-produced cold-headed unit. Nowhere will you find more of the four basic features you need — price, quality, service and research — than from American. *Make your own comparisons:* send us your inquiry for price and delivery or your specifications for special fasteners. Write:

American!

AMERICAN SCREW CO. • WILLIMANTIC, CONN.
NORRISTOWN, PA. • CHICAGO, ILL. • DETROIT, MICHIGAN

company, Lindberg Industrial Corporation. Melrose Park, Ill. Neither element nor operator will be hurt.



this man is SAVING his company money...

SPEEDING PRODUCTION

He's stripping oily grime from machine tools with Hypressure Jenny *before repairs or repainting.* He's *saving his company* money, because he is doing the job in one-sixth of the time taken by hand methods. Also it is a known fact that when mechanics work on clean equipment, unhampered by grease and grime, production steps up . . . job time is shortened . . . costs are reduced.

But that's only half of it!

Besides cleaning all types of production machinery, tools and equipment, Jenny saves up to 90% of the time and labor costs of cleaning floors, walls, windows, and lavatories . . . reduces fire hazard; increases plant safety; and speeds production through better working conditions.

If you would like to know more about HYPRESSURE JENNY STEAM CLEANER and the many ways it can save your company money . . .

WRITE, OR MAIL THE COUPON TODAY! No Obligation.

HYPRESSURE **Jenny** STEAM CLEANER

Without obligation send me complete information on HYPRESSURE JENNY STEAM CLEANER

Name_____ Title_____

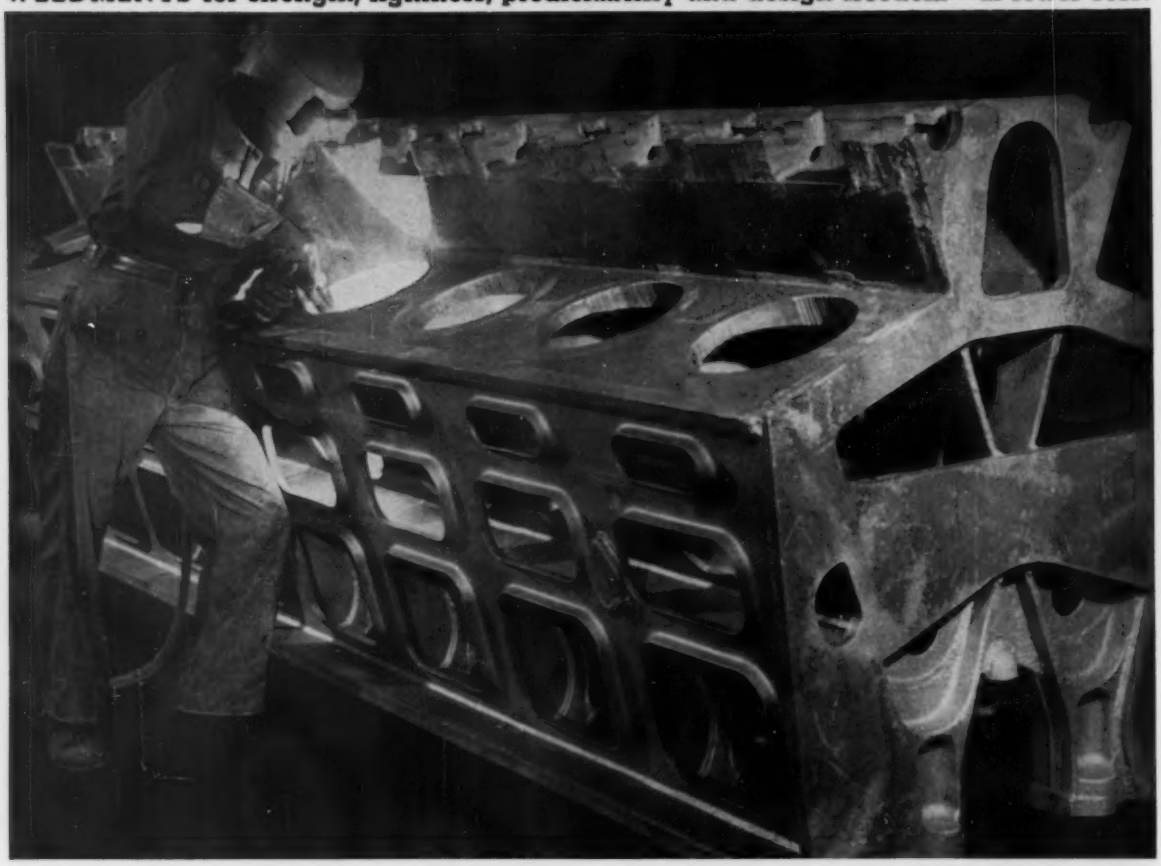
Company_____

Address_____

City_____ State_____

HYPRESSURE JENNY DIVISION
HOMESTEAD VALVE MANUFACTURING COMPANY
P. O. BOX 23 "Serving Since 1892" CORAOPOLIS, PA., U.S.A.

WELDMENTS for strength, lightness, predictability and design freedom—at lower cost!



DIESEL ENGINE FRAME: Weldments of this type have been responsible for weight savings as high as 32% with no sacrifice in strength and safety. Superior shock resistance protects engine performance. Maintenance costs are reduced and significant economies realized.

HERE'S THE STORY OF QUALITY BEHIND EVERY LUKENWELD WELDMENT

Lukenweld's extensive production facilities and experience add up to this: no matter how big, tough, or challenging the job, you get exactly what you want—on time—and at a cost that will fit your plans.

DEPENDABILITY The predictability and rigidity of welded structures plus Lukenweld's specialized knowledge of design and materials selection assures equipment that will perform efficiently, longer.

RELIABLE SOURCE OF MATERIALS Carbon, alloy and clad steel plates in the widest range of types and sizes available anywhere are obtainable "right next door"—from the Lukens rolling mills.

CONSULTATION SERVICE Metallurgical, design engineering, related services are available on your job.

FINISHING FACILITIES Modern heat treating, machining and other finishing facilities are your assurance of complete quality control from steel plate to finished weldment—ready for assembly in your equipment.

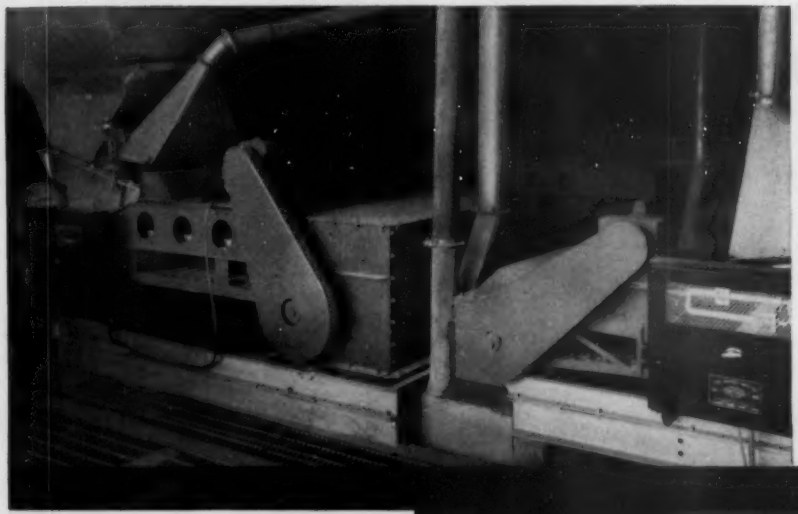
EXPERIENCE Lukenweld, the first commercial weldery in the U.S., pioneered many advances in welded construction. Knowledge and craftsmanship gained through this experience make Lukenweld unusually qualified to meet your weldment needs.

FOR INFORMATION on how Lukenweld can answer your particular weldment problems or for a copy of the informative booklet, "Weldments by Lukenweld," write on your company letterhead to Manager, Marketing Service, 819 Lukens Building, Coatesville, Pa.

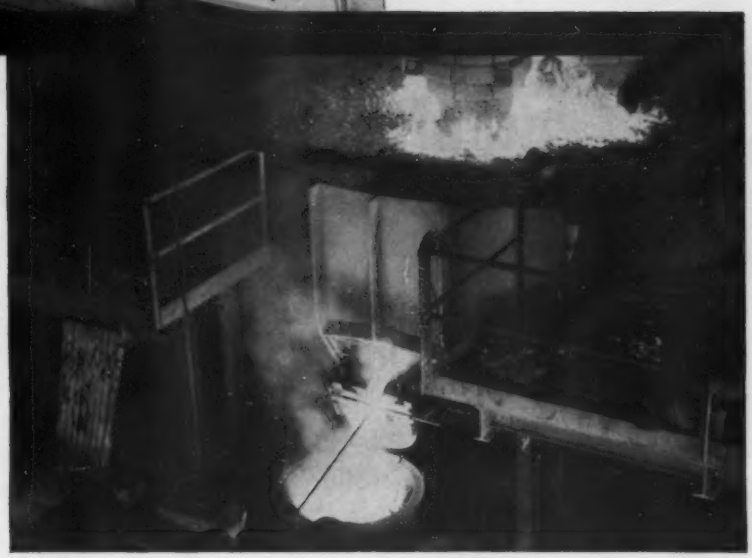
LUKENWELD LUKENS

A DIVISION OF LUKENS STEEL COMPANY
COATESVILLE, PENNSYLVANIA

WAYTROLS® feed an inferno with ± 1% accuracy



A metal producer reports ± 1% accuracy in proportioning with a pair of Jeffrey WAYTROLS.



Close formulation of the mixture as provided by WAYTROLS is vital to quality production in an electric furnace.

Mix an ore with slagging and reducing agents in the proper proportions. Apply the 3100° heat of an electric arc under carefully controlled conditions. Draw off the molten metal. Basically, that's the electrothermic process so widely employed today.

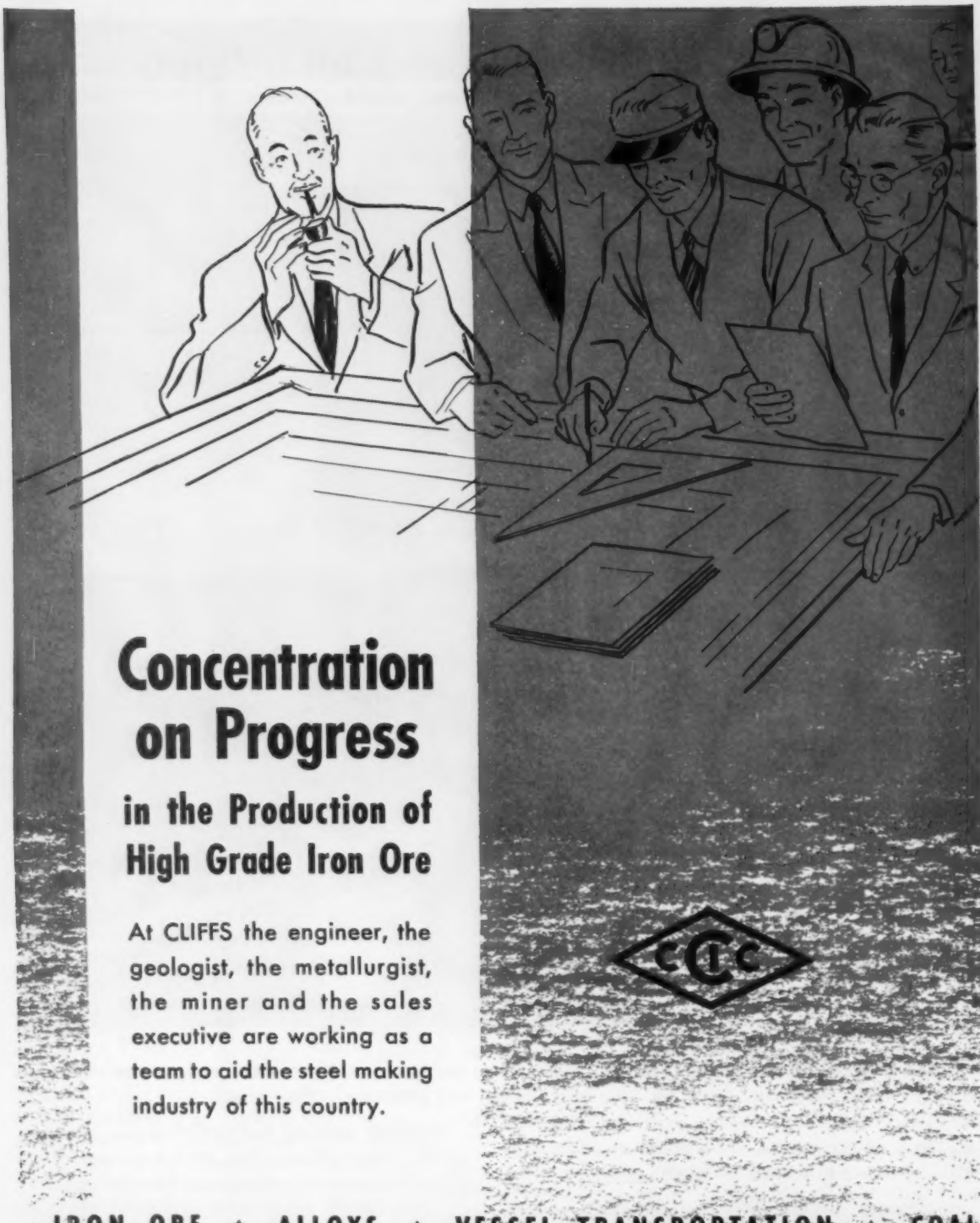
"Proper proportions" is the keynote to success. Inaccurate proportioning may ruin the entire process. Jeffrey WAYTROLS (continuous weigh feeders) help avoid that hazard.

WAYTROLS take materials from overhead hoppers and feed them at predetermined quantities or rates; so many ounces, pounds or tons per hour. They do this within the accuracy of the weighing equipment itself and without dependence upon the attention and judgment of the operator.

Weighing, batching and proportioning systems are described in Catalog 841. For a copy, write The Jeffrey Manufacturing Company, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING



Concentration on Progress

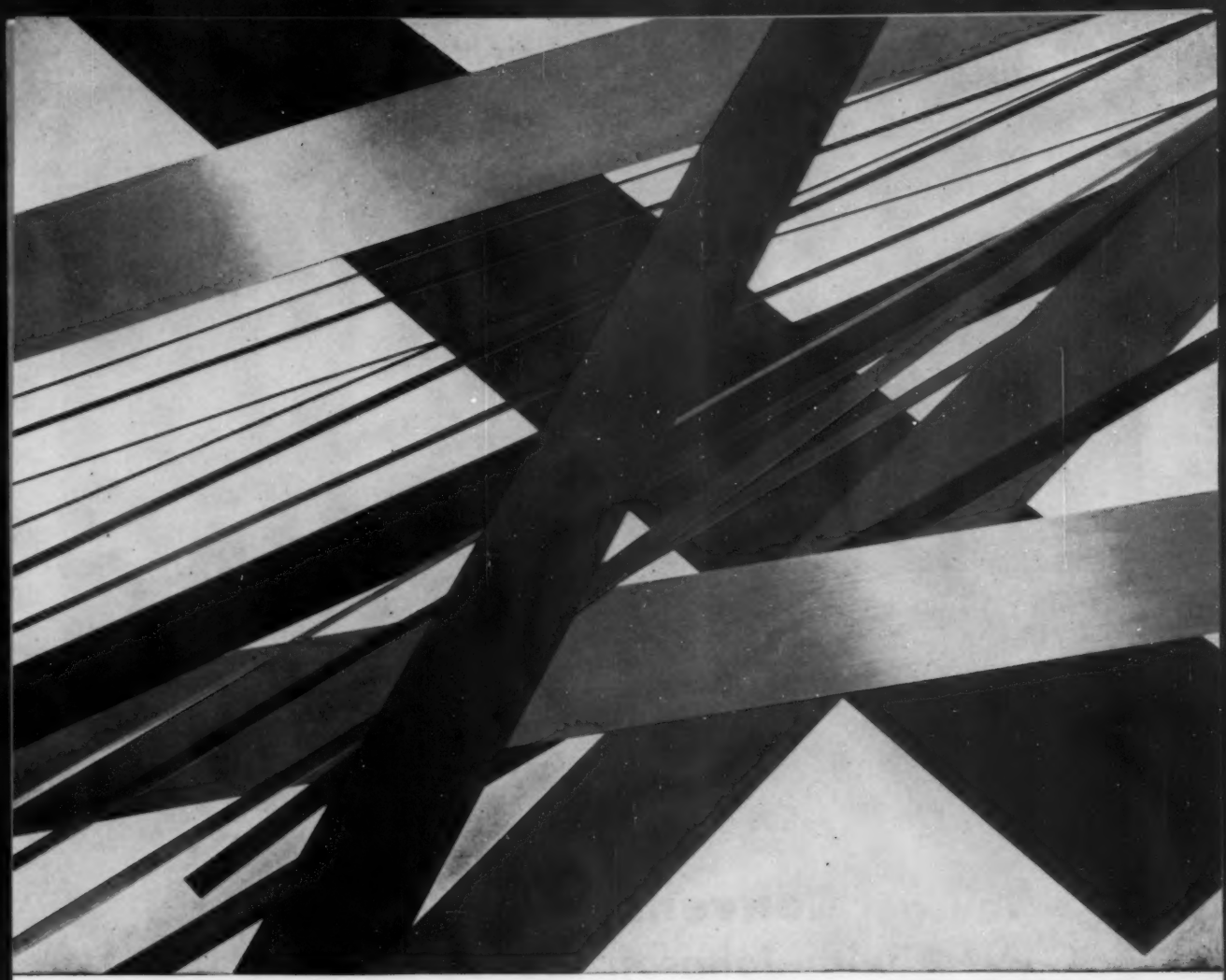
in the Production of High Grade Iron Ore

At CLIFFS the engineer, the geologist, the metallurgist, the miner and the sales executive are working as a team to aid the steel making industry of this country.

IRON ORE ★ ALLOYS ★ VESSEL TRANSPORTATION ★ COAL

The Cleveland-Cliffs Iron Company

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO



How these "educated" steels make products behave better

● Nobody will deny that there can be a vast difference between steels that are supposedly alike. The difference lies in "tremendous trifles" that often make all the difference between smooth and erratic fabrication or between satisfactory and faulty product behavior.

That's why the steels shown above are "educated", you might say—educated for special use. Because here at the *Athenia Steel Division* of National-Standard we've concentrated for years on learning about and *controlling* those tremendous trifles! In turn, this learning and experience is put right into the Athenia steels that successfully meet many of the toughest assignments known today.

If your production calls for cold rolled flat steels of .45 carbon or higher, from .015" to 16" wide and from .001" to .065" thick, it would be a good idea to explore Athenia quality, performance and service.

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape

ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel

REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth

NS
NATIONAL-STANDARD
Company
NILES, MICHIGAN

WAGNER LITHO MACHINERY • JERSEY CITY, N. J.
Special Machinery for Metal Decorating

WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

You get **Convenience** *and* **Quality** with Johnson Bronze Bars

For your convenience, Johnson Bronze solid and cored bars are now stamped on each end with the exact size. This makes it unnecessary to remove bars from bins to check the OD for size—helps prevent errors—makes for quick inventory. Also, bars of various sizes can be stored in one bin because the size is visible which saves storage space.

In addition, the ends of all Johnson bars are centered for ease and accuracy of machining. All the operator has to do is set the chuck on the indented marks, take a $\frac{1}{64}$" cut and he has the size bar indicated. This speeds machining, assures concentric parts since the work is always in perfect alignment. Also, Johnson bars are in the convenient 13" length—are easy to store and handle.

The quality of Johnson bronze bars is rigidly controlled from heat to heat by frequent chemical analysis. These bars are produced in permanent molds or by centrifugal casting. Either method eliminates the possibility of sand inclusions—allowing maximum uniform density.

Johnson Bronze bars are available in over 400 stock sizes. They are used extensively for making bearings, washers, thrust plates, gears, pinions, guides, rollers, sheaves, trolley wheels and other parts for original equipment and maintenance. They are quickly available from your distributor. Ask him for a folder which lists the range of sizes of cored and solid bars or write Johnson Bronze Company, 505 S. Mill Street, New Castle, Pa.

Johnson Bearings

GRAPHITED
over 175 sizes

GENERAL PURPOSE
over 900 sizes

UNIVERSAL BRONZE BARS
over 400 sizes

LEDALOYL
over 400 sizes

ELECTRIC MOTOR
over 350 sizes

HOW USS "T-1" STEEL IMPROVES THESE PRODUCTS:

Pays Off In Payloader. Speed is emphasized in International Harvester's new Model 12 Payloader. That means weight had to be cut. And USS "T-1" Steel helped cut weight of the rugged boom. This remarkably tough, strong steel is used at top and bottom sides where maximum stresses are imposed. The section depth of the USS "T-1" Steel parts is 12 inches. With other, less strong steels, section depths of 19 and 24 inches would have been required—much too large to fit the contour of the machine. USS "T-1" Steel cut size, weight . . . was cold bent, and welded to other parts of the machine by automatic submerged arc welding.

Stops Brake Breakage. Columbiana Cylinder Grinding Company, Columbiana, Ohio, does a lot of custom machining on industrial and mining equipment, including repair of brake and clutch bands for large earthmoving equipment. On the original equipment these bands are made of plain mild steel . . . often break under the tremendous stresses encountered. Columbiana replaces these broken bands with new ones of USS "T-1" Steel—has yet to have a USS "T-1" band break.

More Strength, Less Weight. This lift truck, in use at Baltimore Concrete Plank Corporation, and manufactured by Gerlinger Carrier Company, Dallas, Oregon, is the largest standard-line lift truck on pneumatic tires in the world. USS "T-1" Steel reduced the width and thickness of the forks on this truck. In addition, this extremely tough constructional alloy steel eliminated the need for shipping the forks 75 miles for heat treatment, which was required with the alloy steel previously used.

HOW IT CAN HELP YOU

USS "T-1" Steel, with its high minimum yield strength of 90,000 psi and its minimum tensile strength of 105,000 psi, can help you design or build lighter-weight equipment that will last longer. Its unusual toughness can help you design or build equipment capable of taking severe impact and abuse at sub-zero temperatures. Its excellent weldability can help you cut the cost of fabricating highly stressed parts, and reduce repair and maintenance expense. Its good creep rupture strength can help you put more durability in equipment that operates at temperatures as high as 900 degrees F.

Somewhere in your operation, versatile USS "T-1" Steel can help you. For technical assistance or information, write, wire, or phone United States Steel, Pittsburgh 30, Pa.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS "T1" CONSTRUCTIONAL ALLOY STEEL

SEE The United States Steel Hour; it's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

USS

UNITED STATES STEEL

"We forged 10-foot rings from a 5-foot ingot... in stainless steel"

says **John Matthews,**
U. S. Steel General Foreman—Forging

It required many days to take the photographs on this page, days of forging and re-heating. The forgings are made from type 304 stainless steel, and they're destined for a nuclear power plant. Now read why it took so long to make them.

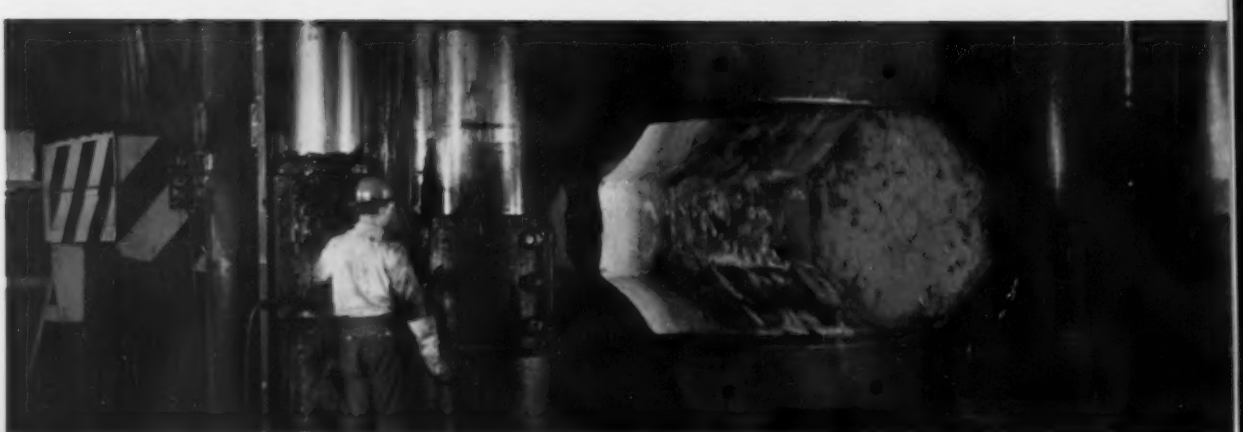
Stainless is strong and stiff, even at forging temperatures. It requires more passes through the press, more die pressure, and the dies wear out faster. If you forge it too long, so that it gets "cold," it will develop small surface cracks beneath the great jaws of the press.

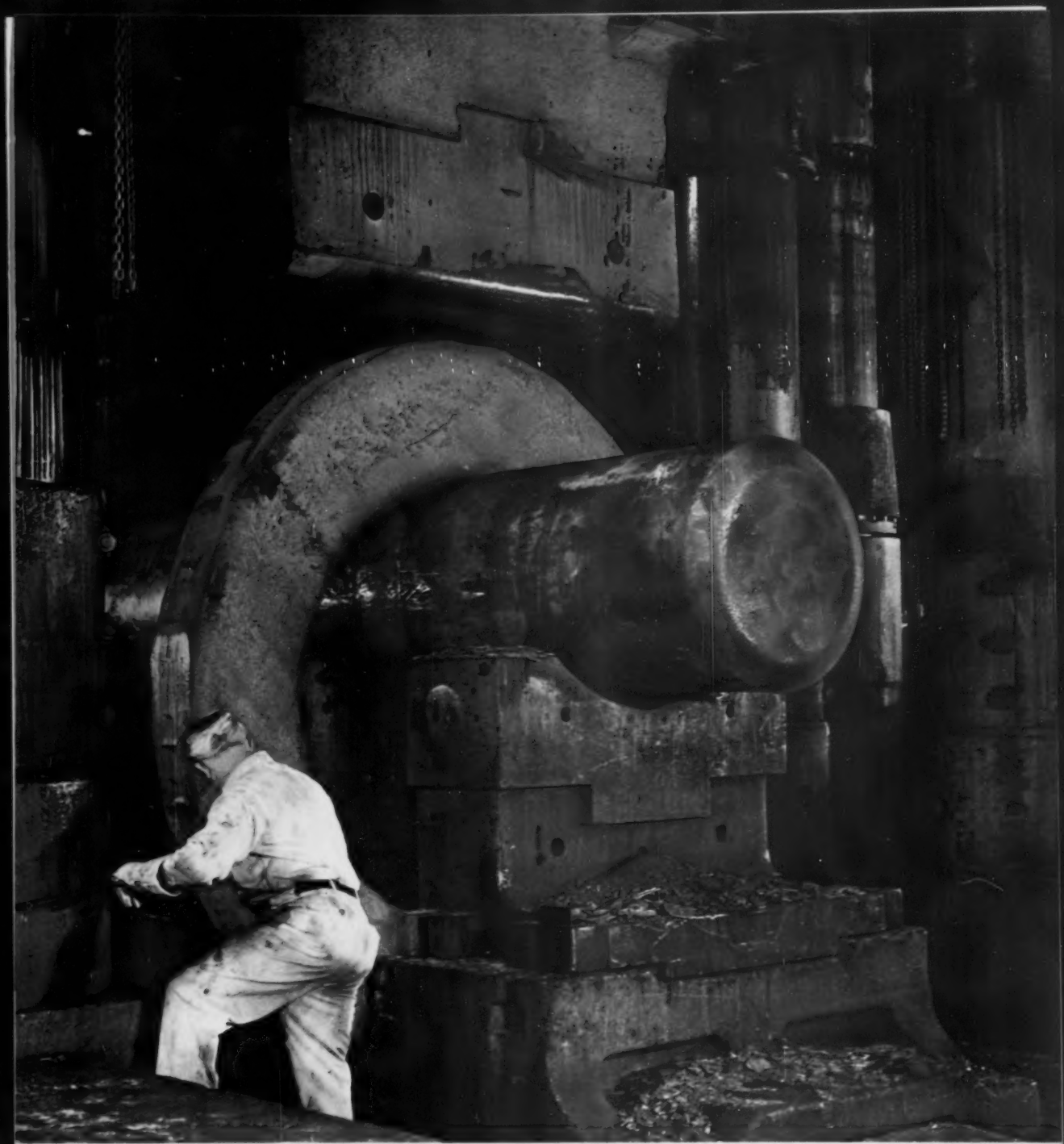
In John Matthews' words:

"We started with a 59″ fluted ingot and forged it down to a 40″ octagon, then sliced it into three flat discs. The thickest disc was forged down to 18″, and we put a 23″ hole through it with steel punches. Then it was worked over the big steel mandrel to finished size: 119″ outside diameter, 80″ inside diameter, 10½″ thick. The other two rings were somewhat thinner."

It was a tricky job, but USS Quality Forgings like this are being turned out every day because we've got the men with the skill to do the job right.

We'll certainly appreciate your inquiries. Send them, or requests for our free 32-page booklet on USS Quality Forgings to: United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.



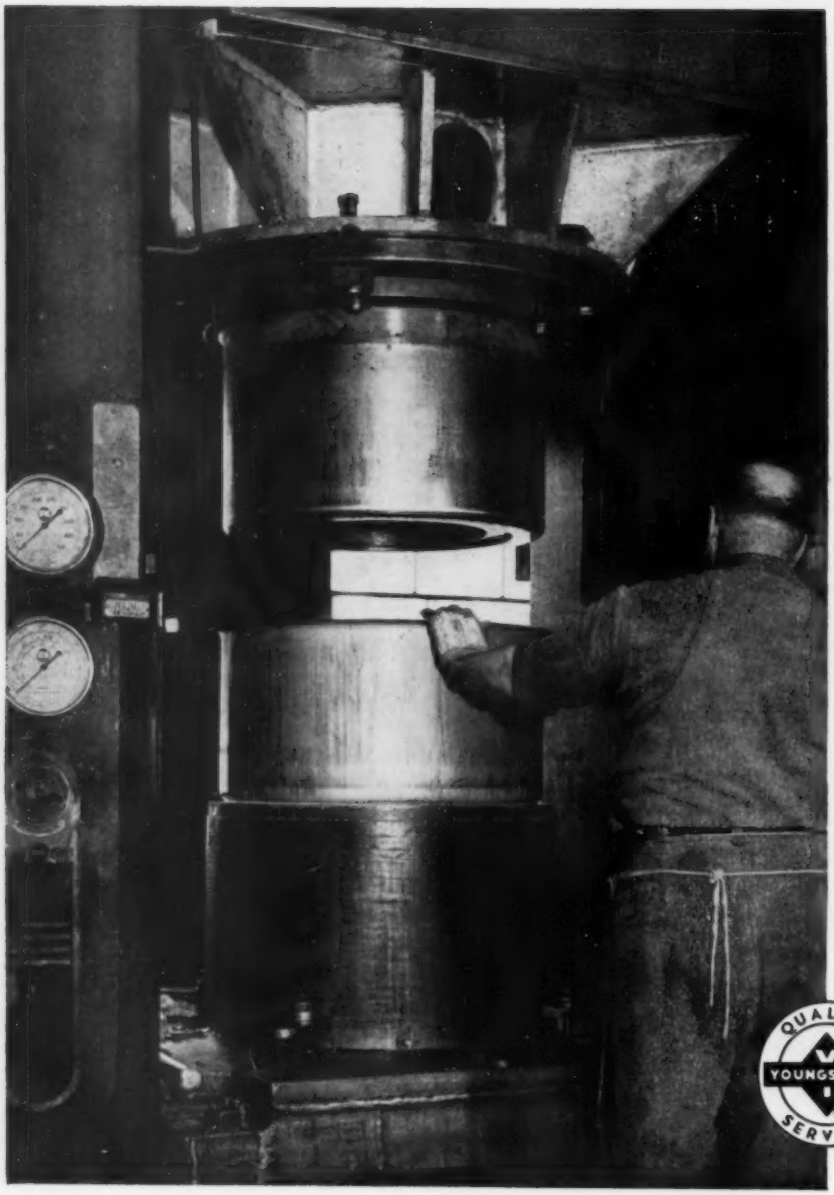


USS QUALITY FORGINGS

heavy machinery parts . . . carbon, alloy, stainless
forged steel rolls and back-up roll sleeves
electrical and water wheel shafts
specialty forgings of all types

UNITED STATES STEEL

When press costs climb fast put Youngstown sheets and strip on the job



Are rising production costs haunting your press shop? If so, why not specify Youngstown Cold Rolled Sheets and Strip and give a healthy shot-in-the-arm to your drawing and stamping operations. Satisfied users all over the nation tell us the same story: "Our production is up—Rejects are down!" This gives an over-all cost reduction which looks mighty good to any front office.

Youngstown Sheets and Strip are known for their uniform high quality. Rigid quality control of every phase of their production guarantees the proper ductility, tensile strength, flatness and surface finish to meet your **exact specifications.**

Why not call your nearest Youngstown District Office today, for additional information or metallurgical assistance—or write direct to our Home Office.

QUALITY YOUNGSTOWN SERVICE

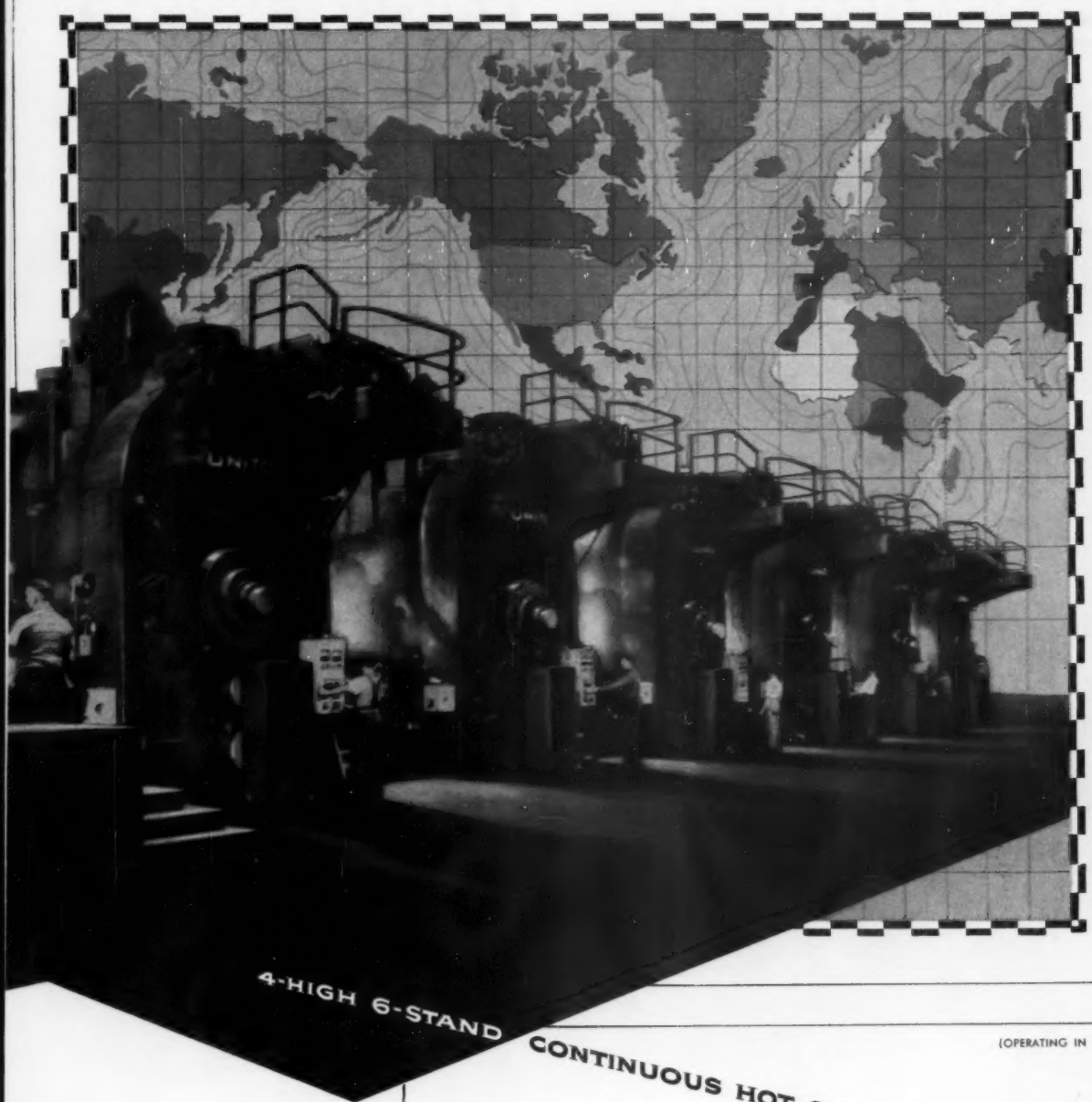
COLD ROLLED SHEETS AND STRIP

Youngstown
SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities

Producers of Quality Carbon and Alloy Steels for Over Half a Century



4-HIGH 6-STAND CONTINUOUS HOT STRIP MILL

(OPERATING IN WALES)

DESIGNED AND BUILT BY

UNITED

ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

UNITED can serve you no matter where in the world you are.

Plants at: PITTSBURGH • VANDERGRIFT • YOUNGSTOWN • CANTON
WILMINGTON (LOBDELL UNITED DIVISION)

Subsidiaries: ADAMSON UNITED COMPANY, AKRON, OHIO
STEDMAN FOUNDRY AND MACHINE CO., INC., AURORA, INDIANA

Designers and builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Process Equipment, Presses and other Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel Castings, and Weldments.

Your production requirements *at our fingertips!*

Hand your fabricating problems to P & A! Our complete range of fabricating facilities, finishing equipment and parts assembly are available to you for prompt, economical, quality production. The shortest distance between your blueprints and the finished product is 'via P & A'!

P&A

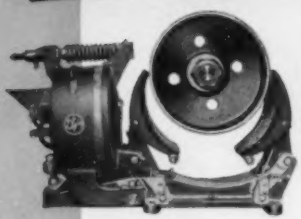
FABRICATING DIVISION

THE PLUME & ATWOOD MANUFACTURING COMPANY

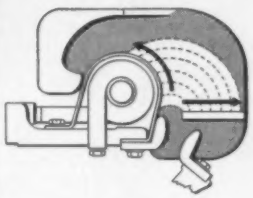
Thomaston, Conn.

It's EC&M for a Complete Line of ELECTRIC CRANE CONTROL

BRAKES · DISCONNECT SWITCHES · CONTROLLERS · LIMIT STOPS

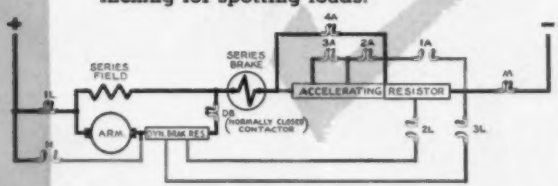


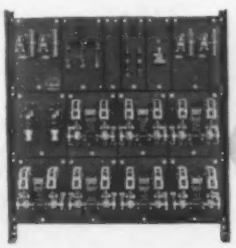
LONG-LIFE BRAKES for cranes operated by A.C. or D.C. power. High speed performance. Low upkeep.



CONTACTORS operate on the LINE-ARC principle. No destructive burning of arc shields. Cool contacts and reduced maintenance.

DYNAMIC LOWERING CIRCUITS for hoist motions. Respond quickly. Permit accurate inching for spotting loads.

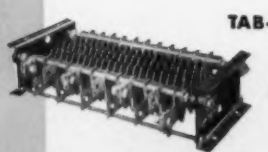




REVERSING-PLUGGING CONTROL for bridge and trolley motions. Automatically controlled acceleration. Only one adjustable relay for plugging.

YOUNGSTOWN SAFETY LIMIT STOPS protect against overhoisting accidents. Positive check against human errors.

CAM-TYPE MASTER SWITCHES have narrow width and short throw. Less operator fatigue.



TAB-WELD PLATE RESISTORS —spot-welding provides a continuous path, and keeps resistance value constant.

MANUAL-MAGNETIC DISCONNECT SWITCHES are very easy to operate. They are arranged to control crane lights, too.

SQUARE D COMPANY

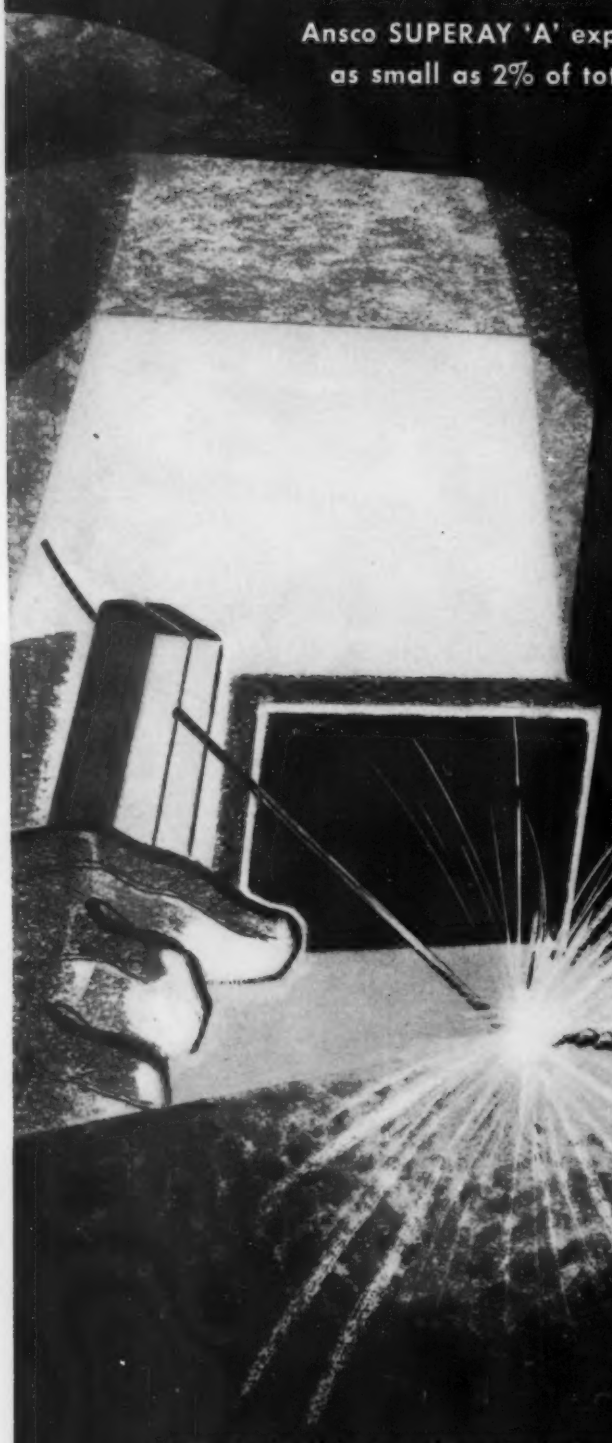
EC&M DIVISION · CLEVELAND 28, OHIO

7405

Ansco Superay 'A' sets the standards:

DETECT WELD FLAWS INSTANTLY!

Ansco SUPERAY 'A' exposes discontinuities as small as 2% of total joint thickness



Inspect welds—inside and out—*on the spot* with radiographs made on ANSCO SUPERAY 'A' FILM! *Extra* contrasty SUPERAY 'A' FILM points up even hairline cracks, or discontinuities! With reliable SUPERAY 'A' your job progresses quickly . . . your welders leave no problems behind!

ANSCO films and chemicals are backed by over a century of research and development. For broadening your present use of radiography . . . or starting on this efficient and cost-saving method . . . look to ANSCO for leadership in photographic materials.

The Right Film for Every X-Ray Need:

SUPERAY 'A'—a versatile rugged and sensitive "workhorse" film
SUPERAY 'B'—finer grain for maximum definition
SUPERAY 'C'—high-speed for production line inspection

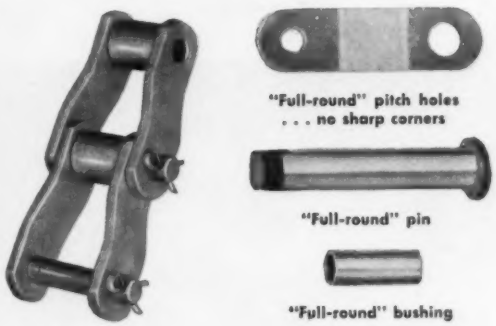
The right chemicals for perfect processing results: Liquadol, Liquadol Replenisher, Liquafix.

Ansco
BINGHAMTON, NEW YORK

America's oldest maker of photographic materials . . . *Ansco*

"Stress raisers" eliminated by Link-Belt LXS chain design

LXS "FULL-ROUND" DESIGN



"FULL-ROUND" DESIGN eliminates stress concentration points. Heat treatment of all parts adds even greater strength and extra wear life to selected steels. Accurate control of these processes avoids brittleness, poor wear values and low tensile strengths . . . and assures uniformity.

Large pins, bushings mean ample live bearing area for long life

For long life under severe conveyor and drive conditions, Link-Belt LXS chain provides extra strength, increased wear resistance and wider application flexibility. This fabricated steel roller chain incorporates many advanced design and manufacturing refinements, resulting in superior ruggedness and accuracy.

Eliminate weak points

"Full-round" design does away with stress concentration points most frequently subject to failure . . . provides maximum live bearing area between pin, bushing and sidebars. As a result, stress is distributed evenly, increasing chain life.

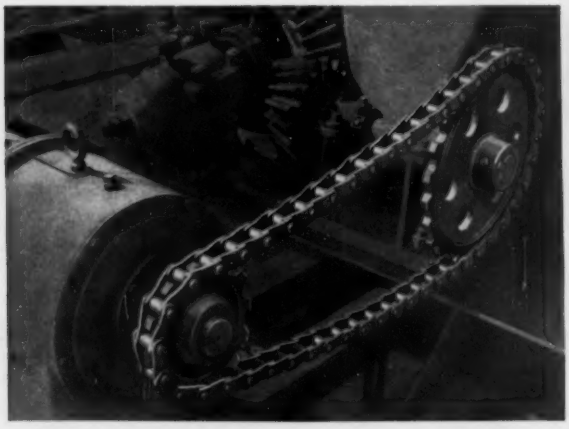
Pins and bushings are accurately sized for controlled press fit, preventing rotation in sidebars. Made from selected bar steel, sidebars are carefully machined for proper pitch hole size and for maintaining firm, tight press fit of pins and bushings. This assures close control of pitch and proper chain length after assembly.

Hardening extends life

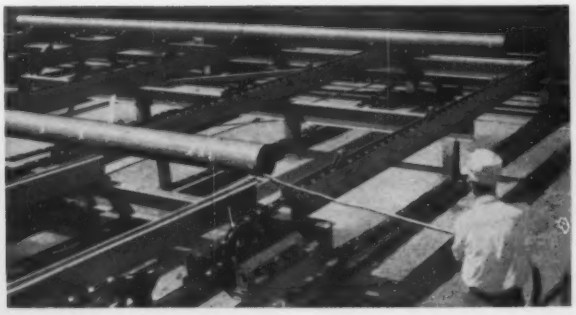
Another Link-Belt long-life extra is the controlled hardening of selected steels used in the manufacture of LXS chain. Pins, for example, are made from a tough steel, specially treated for high strength in shear and for maximum wear value. Bushings are properly hardened to shrug off shock and resist wear.

Rollers are accurately machined to assure proper operating clearances and free-rolling action. Controlled hardening gives them the necessary resiliency and durability.

LXS especially popular for exposed drives, high impacts



Link-Belt LXS chain is the long-life answer for exposed drives, abrasive and high-impact conditions. Its large, live bearing area reduces cutting action of abrasives because load is spread over a broad area.



LXS chain provides extra strength, wear-life for heavy-duty conveying

Link-Belt LXS chain has real stamina—as shown in this conveyor application for handling 1000-pound, 40-foot lengths of steel pipe. Thanks to accuracy of pitch and attachment spacing, plus close matching of multiple strands, LXS has the added strength and wear life for the extra-long conveyors so popular in today's move to mechanization.

HEADQUARTERS FOR CHAINS, SPROCKETS is your nearby Link-Belt factory branch store or authorized stock-carrying distributor. Write for 342-page Catalog 950.

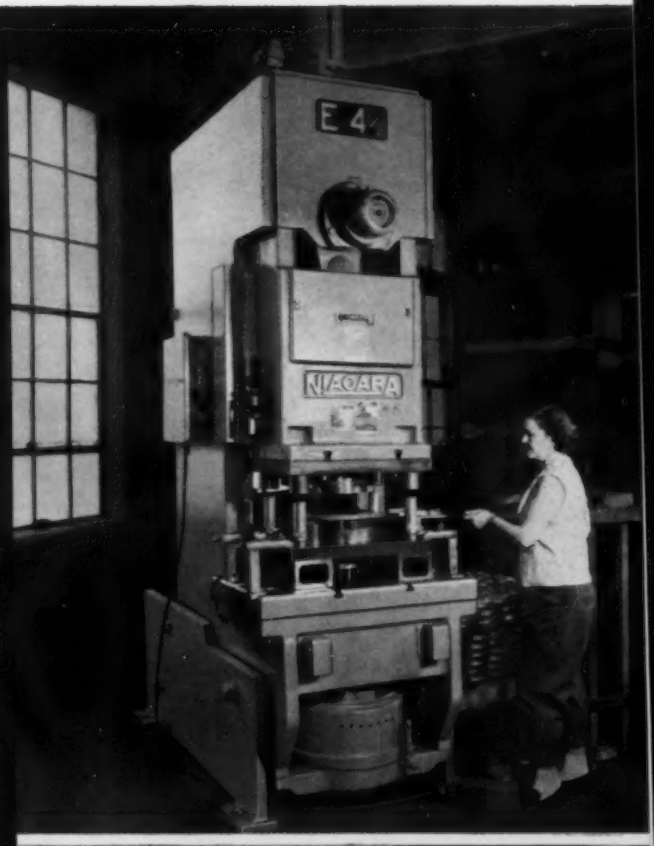
LINK-BELT

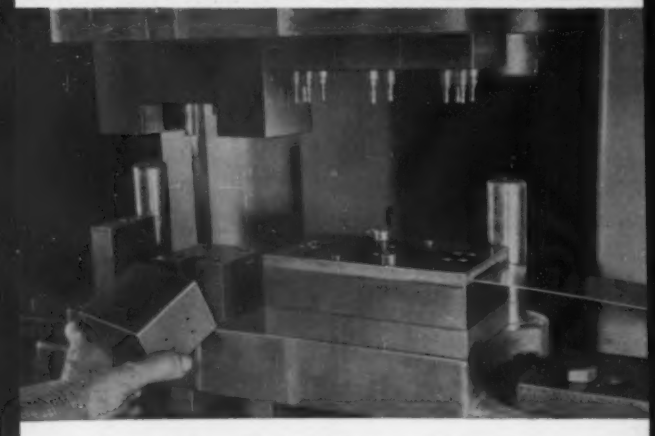
CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.257

Take it from the early birds...

"IT'S THE GREATEST





Niagara Series E 4½ OBI Press in operation at a well known eastern commercial stamping plant. Work includes stamping small wrenches; trimming canopies for electrical fixtures; piercing, cutting off and forming saddles with a progressive die (shown).

Niagara Series E 4½ OBI Press engaged in blanking and drawing of kitchen cannister lids from half-hard aluminum at midwestern housewares manufacturing plant.

"we can produce from 8,000 to 10,000 pieces in an eight hour day"

"much safer press"

"takes less floor space"

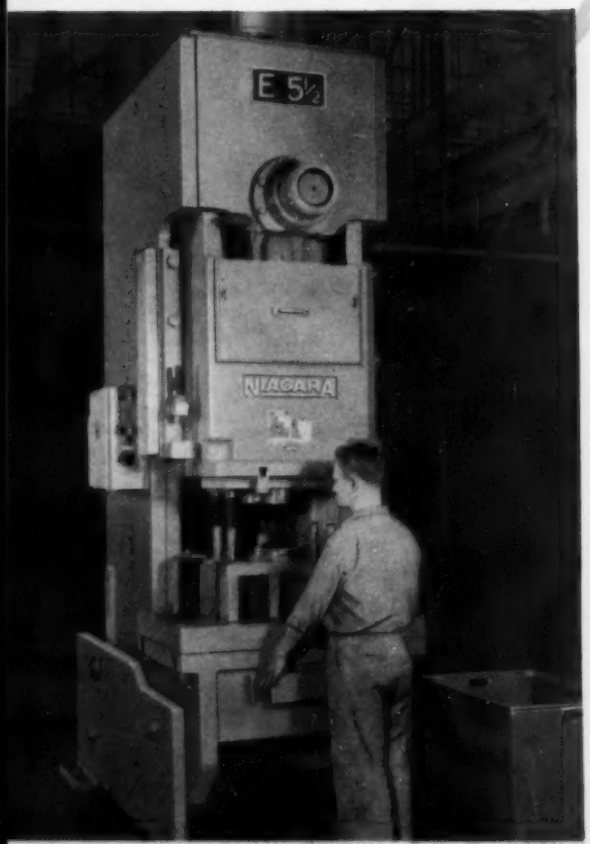
"has a centralized pressure lubricator which we like very much"

O.B.I. EVER BUILT"

"we find that dies without posts work much better on this press"

"all dies give better and longer runs"

"large slide area for large trimming, blanking and progressive dies"



Niagara Series E 5½ OBI Press forming and trimming hemispherical copper parts for one of the "Big Two" electrical manufacturers.

Few developments in metalworking history have drawn the enthusiastic endorsement given Niagara's revolutionary Front-to-Back Crankshaft OBI Press.

Now, as at the 1955 Machine Tool Show where it was unveiled, there is *nothing* even remotely resembling it in the industry... design-wise and production-wise.

Customers in U.S. and Canada... the "early birds" who are doing their modernizing with the most modern press of all... can today tell you about accomplishments with this newest and greatest of OBIs that you would have never dreamed possible. Yes, the press that Niagara conceived to do more than any OBI ever built is doing just that for a fast-growing list of metalworking plants.

There's a huge fund of successful experiences that a Niagara representative can share with you today. Draw on it now and utilize it in your modernization plans. Make a date, at your convenience, for a personal call.

...and if you haven't received new Bulletin 56 with complete design description and specifications (75-200 ton capacities, 4½-7½ inch shaft diameters, standard and automated models) write for your copy at once. You will find it invaluable to your planning.

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N.Y.

DISTRICT OFFICES:

Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia

Distributors in principal U. S. cities and major foreign countries

•

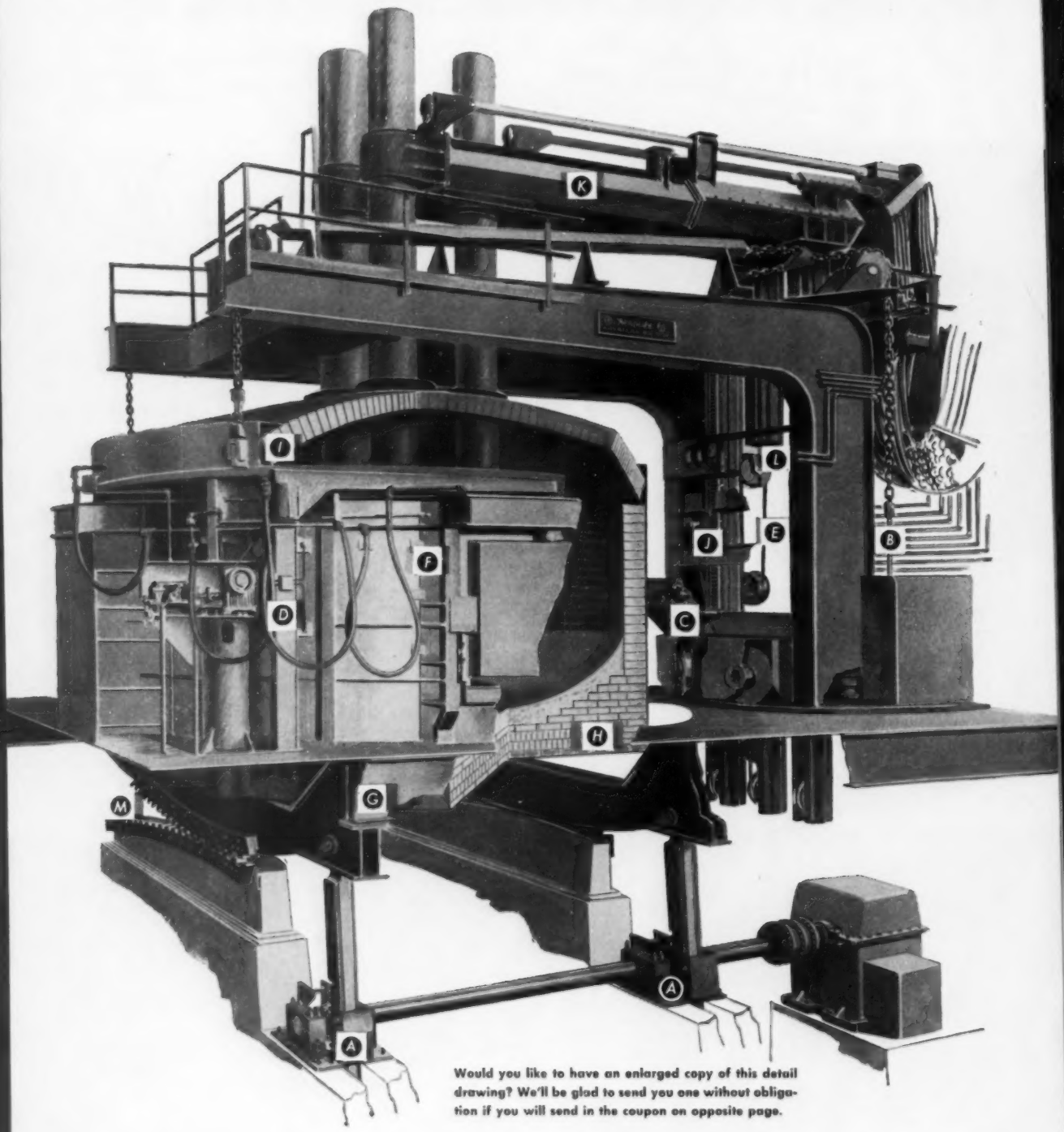
America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work

NIAGARA

front-to-back crankshaft INCLINABLE PRESSES

Ten (10) reasons why

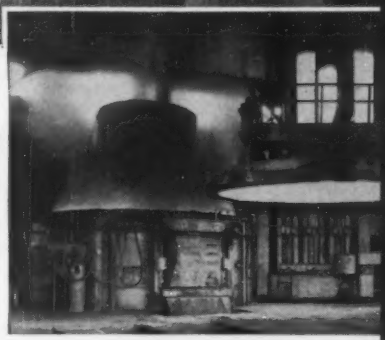
is the finest electric furnace



Would you like to have an enlarged copy of this detail drawing? We'll be glad to send you one without obligation if you will send in the coupon on opposite page.

We welcome an opportunity to help you select and install the Heroult Furnace best suited to your requirements. Remember—*the Heroult we make and install for you will be the finest electric melting furnace that money can buy!*

the NEW Heroult on the market!



To HELP YOU PRODUCE better quality steel faster and more economically, we have made important design improvements in the long-famous Heroult electric melting furnace. Five of the features shown in the cutaway drawing at the left and described below are to be found *only* in the new Heroult. *All ten* of the illustrated features are important to those interested in the most modern melting equipment. Any way you look at it—performance efficiency, operating economy, or low-cost maintenance—this *new* Heroult is unquestionably the *finest* electric melting furnace on the market.

1. The Heroult Furnace is *the only 100% mechanically operated electric furnace.*

It includes such mechanical features as: (A) heavy rack-and-pinion-type tilting mechanism, (B) mechanical roof lift, (C) motor-driven, rotating, jib-type roof swing, (D) winch-operated, water-cooled, jib-type door-lifting mechanism, and (E) high-speed, electro-mechanical electrode-positioning mechanism.

2. *Another exclusive* — Cage-type shell construction with shell plates loosely attached (F) to a heavy supporting structure.

This construction minimizes shell warping and allows easy replacement of damaged shell plates.

3. *Exclusive*—Operating mechanism independently supported.

The tilting platform on which all operating mechanisms are supported is attached directly to the rockers independent of the shell structure (G). Thus operating mechanisms are unaffected by any shell distortion.

4. *Exclusive*—Flat Bottom Shell.

This feature (H) facilitates easy shell relining and provides maximum protection against burnouts. Thicker refractory at the sides of the hearth promotes more uniform bath temperature.

5. *Exclusive* — Water-cooled, Skew Back Roof Ring.

This feature (I) eliminates the need for special skew-shaped roof refractories.

6. Electrode Mast Safety Device.

This spring-loaded, rack-and-pawl-type device (J) provides positive protection against damage resulting from electrode winch cable breakage.

7. Square-Section, Water-Cooled Electrode Mast Arms.

This design (K) guarantees a rigid connection between mast and mast arm, thus helping to maintain proper electrode position.

8. Remote-Controlled Electrode Clamps.

This device, of the spring-clamp, air-release type, is located inside of the rear section of the water-cooled mast arm where heat cannot affect it.

9. Square-Sectioned Electrode Mast.

This design feature (L), developed by American Bridge, assures proper guiding and electrode positioning.

10. Rockers.

The heavy fabricated steel curved top and bottom rockers (M) minimize forward travel during tilting. These rockers are so designed that the furnace will tend to return to horizontal position from any degree of tilt.

THE NEW

Heroult

ELECTRIC FURNACES

are available in:

—sizes of shell diameter ranging from 7′ 0″ up, and with capacities of from 6,000 lbs. up to 400,000 lbs. and greater. They are equipped with roof-removing mechanism to permit fast top charging. They can readily be furnished with a non-magnetic shell bottom section to accommodate induction-stirring equipment.

Gantry-type top-charge furnaces, door-charge furnaces, and special furnaces for duplexing and non-ferrous melting can also be supplied.

Heroult

ELECTRIC MELTING FURNACES

Send coupon for catalog and/or enlarged copy of detail drawing with special installation and engineering data.

AMERICAN BRIDGE DIVISION

UNITED STATES STEEL CORPORATION, GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.

Contracting Offices in New York, Philadelphia, Chicago, San Francisco, and other principal cities.

United States Steel Export Company, New York

UNITED STATES STEEL

American Bridge Division
525 William Penn Place, Dept. IA-106
Pittsburgh 30, Pa.

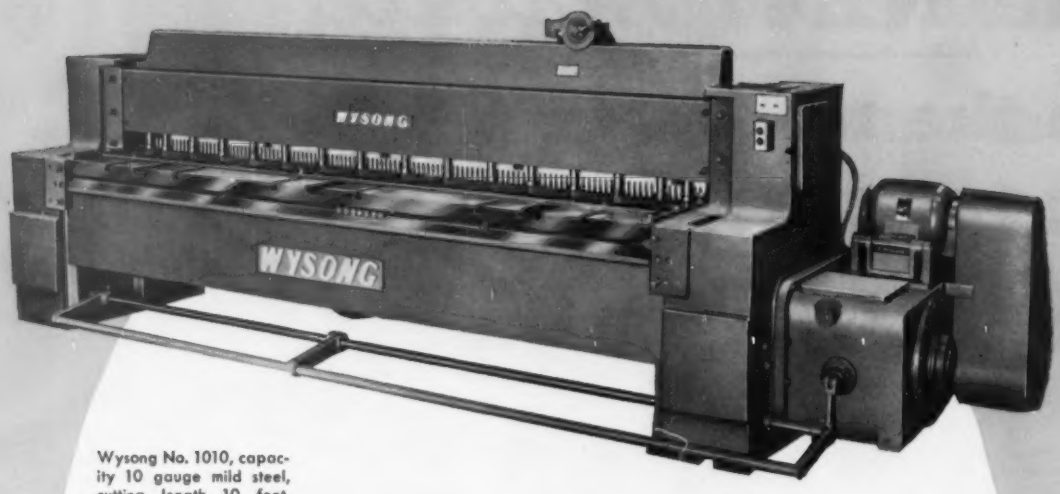
Please send me a copy of the latest Heroult Electric Furnace catalog ( ) and/or) our new folder showing large drawing with special installation and engineering data ( ).

Name ..... Title.....

Firm Name .....

Address .....

City ..... State.....



Wysong No. 1010, capacity 10 gauge mild steel, cutting length 10 feet.

Greater Accuracy! Greater Production! Less Maintenance Costs!

Hi-tensile casting construction gives the necessary weight and mass to Wysong squaring shears. With a tensile strength of 35,000 to 40,000 P.S.I. hi-tensile casting construction can resist the shock and pounding a shear must take. The heavily ribbed table, knife-bar and end frames resist sag or deflection and *maintain accurate alignment*. Because hi-tensile castings absorb vibrations, Wysong shears run quieter and smoother.

Standard features of Wysong shears include:

- Automatic, compensating holddown. Each foot under individual tension. Compensates for varying thicknesses in metal and permits simultaneous shearing of different thicknesses.
- Ball bearing precision back gauge. Adjusts to .0078 (1/128th) inches.
- Time proven, trouble free, 9-jaw clutch with built in non-repeat unit.
- Straddle mounted gears, run in oil.
- Metal finger guard, mounted on holddown. Does not obstruct view of cutting line.

Wysong shears can be equipped with power operated back gauge, a light gauge, remote control switch, automatic lubrication, extension gauges, and rubber pads for holddown feet. Rake of top blade can be changed for cutting plastics, composition sheets and special metals.

Wysong also builds air power and foot operated squaring shears and bending rolls. See your dealer or write to factory for full information.

Buy a Wysong... It's miles ahead.

NATIONAL MACHINE TOOL BUILDERS' ASSN. MEMBER

WYSONG

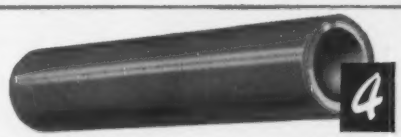
Wysong and Miles Company
Greensboro, N. C.

7 WAYS to SAVE MONEY with TOCCO* Induction Hardening

Cost was reduced 94% when heat-treatment of this corn-harvester part was changed from carburizing to TOCCO-hardening, 9½c saved on every piece — $4750 on each 50,000 piece batch, plus an hourly production increase from 120 to 300 pieces per hour.

Leading automotive companies need and use TOCCO hardened axle shafts to handle higher horsepower. Better, yet cheaper—savings of $375.00 per day. Less machining costs, lower priced material, increased production, and a plus in quality—200% greater torsional life.

Kearney & Trecker Corp. reduced the cost of hardening this milling machine part from $1.57 to 10c apiece. In addition TOCCO made possible a switch from alloy to S.A.E. 1045 steel—saving another 11c per piece in material cost. Kearney & Trecker hardens 140 different parts on one TOCCO unit.



Thompson Products Ltd. boosted production of these automotive wrist pins from 500 to 1200 per hour when they switched to TOCCO-hardening. Costs fell from $5.45 to $3.25 per hundred parts—a savings of 2c per pin, $26.40 per production hour.

Mechanics Universal Joint Division of Borg-Warner reports a 69% savings in the hardening of stub ends for propeller shafts. TOCCO also upped production from 35 to 112 parts per hour—over three times as fast as conventional heating methods.

Lima-Hamilton Corporation adopted TOCCO for hardening this shifting lever. Results: a savings of 4c per piece—$25 per production hour. TOCCO costs only 17% of former heating method. This is only 1 of 139 parts TOCCO-hardened by Lima-Hamilton Corp. All show savings over usual heating methods.

7 Number 7—the lucky number—is up to you. Why not add your name to the list of companies who use TOCCO Induction Heating to increase production, improve products and lower costs. TOCCO engineers are ready to survey your plant for similar cost-saving results—without obligation, of course.

THE OHIO CRANKSHAFT COMPANY

TOCCO

Mail Coupon Today

NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. A-10, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Hardening and Heat Treating."

Name_____

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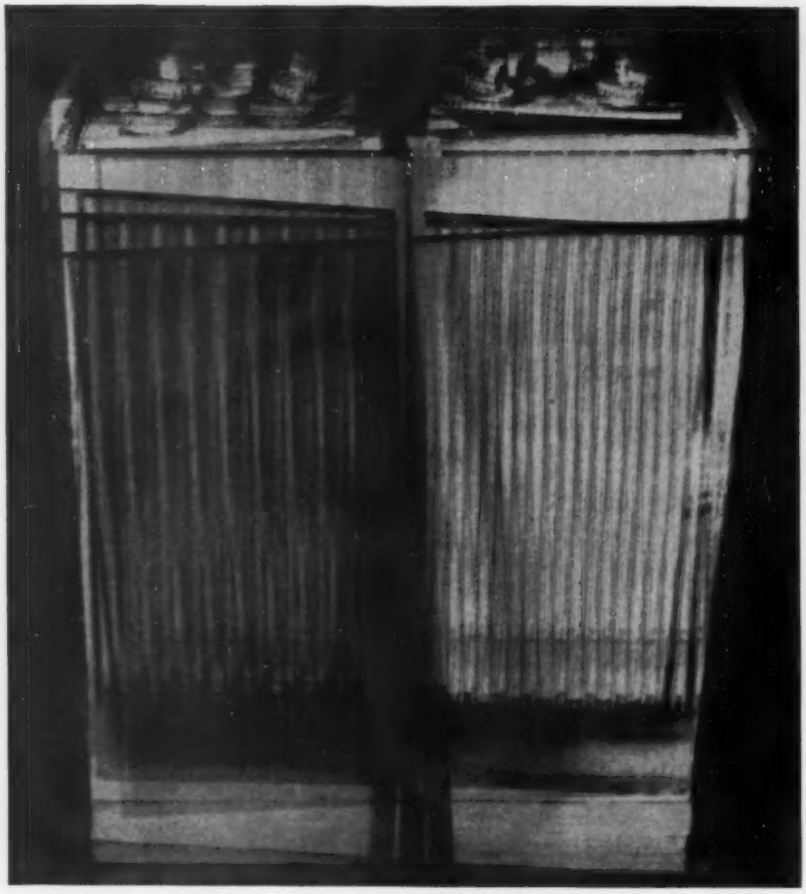
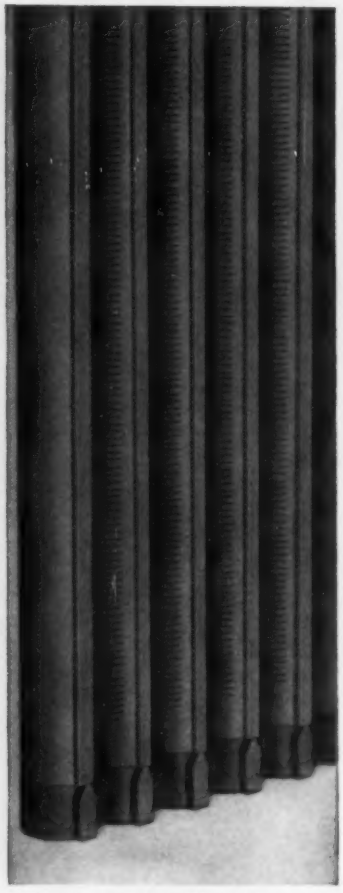
City_____ Zone____ State_____

EXIDE-IRONCLAD BATTERIES

For electric industrial truck operation



Actual photo taken during vibration torture test on an Ironclad Battery



Section of Ironclad positive plate

Vibration can't loosen active material — can't shorten battery life

BATTERY FOR ELECTRIC INDUSTRIAL TRUCK. Exide-Ironclad Model TH. Write for Bulletin No. 5161.

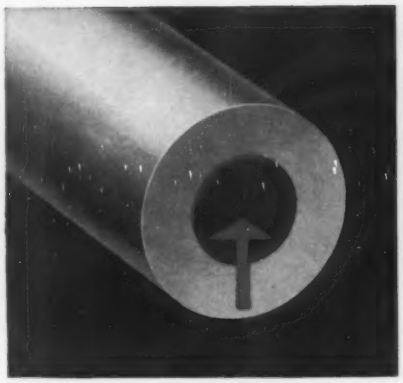
When a heavy duty storage battery gets the "shake treatment," battery life is literally at the mercy of the bond between the positive grid and the active material. Heavy shedding means short life.

But look what happens in an Exide-Ironclad Battery. Active material is held firmly captive inside the plastic power tubes. Hair-thin slits let electrolyte in, but keep active material from falling out. In prolonged vibration tests, this unique design has proved to be a valuable battery life stretcher. These findings are confirmed in the long, dependable service of Exide-Ironclad Batteries in typical high-vibration applications.

This superior performance is only one of the many extra advantages in Exide-Ironclad Batteries — advantages that have earned them an unmatched reputation for long life and high capacity. When you order heavy duty batteries, or the equipment that requires them, be sure to specify Exide-Ironclad. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

Exide®

a hole here makes waste...



a hole here saves waste

Crucible Hollow Tool Steels save waste — time and money — whenever you need ring-shaped parts or tools with a center hole. For the hole is in the piece when you get it! You eliminate drilling, boring, rough-facing operations — save machine capacity for productive work.

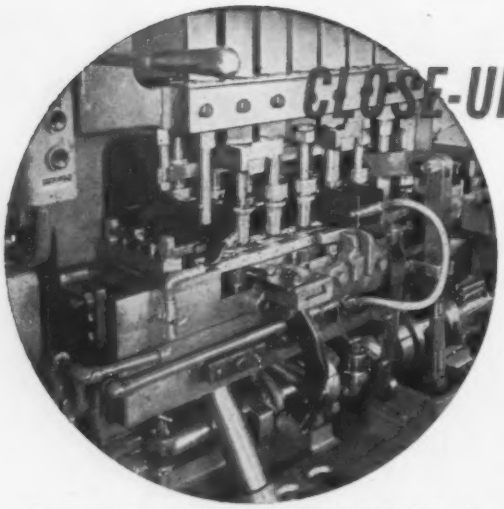
And you can get Crucible Hollow Tool Steels in *any* of our famous tool steel grades . . . in bar lengths or saw cut to your individual requirements. They are made in practically any combination of O.D. and I.D. sizes. What's more, delivery is *immediate* with Crucible's popular KETOS oil-hardening, SANDERSON water-hardening, AIRDI 150 high-carbon high-chromium, AIRKOOL air-hardening, and NU DIE V hot work tool steel grades from warehouse stocks.

Next time you have an application with a center hole, let your Crucible representative show you how these hollow tool steel bars can save you money and time. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Canadian Distributor—Railway & Power Engineering Corp., Ltd.



Close-up of an 8-plunger WF cam eyelet machine showing tools and special attachments. Included are a lever type blank holder, a scrap box fitted with a compressed air blower and oscillating shutter, dovetailed punch holders and a hook type side stabber.

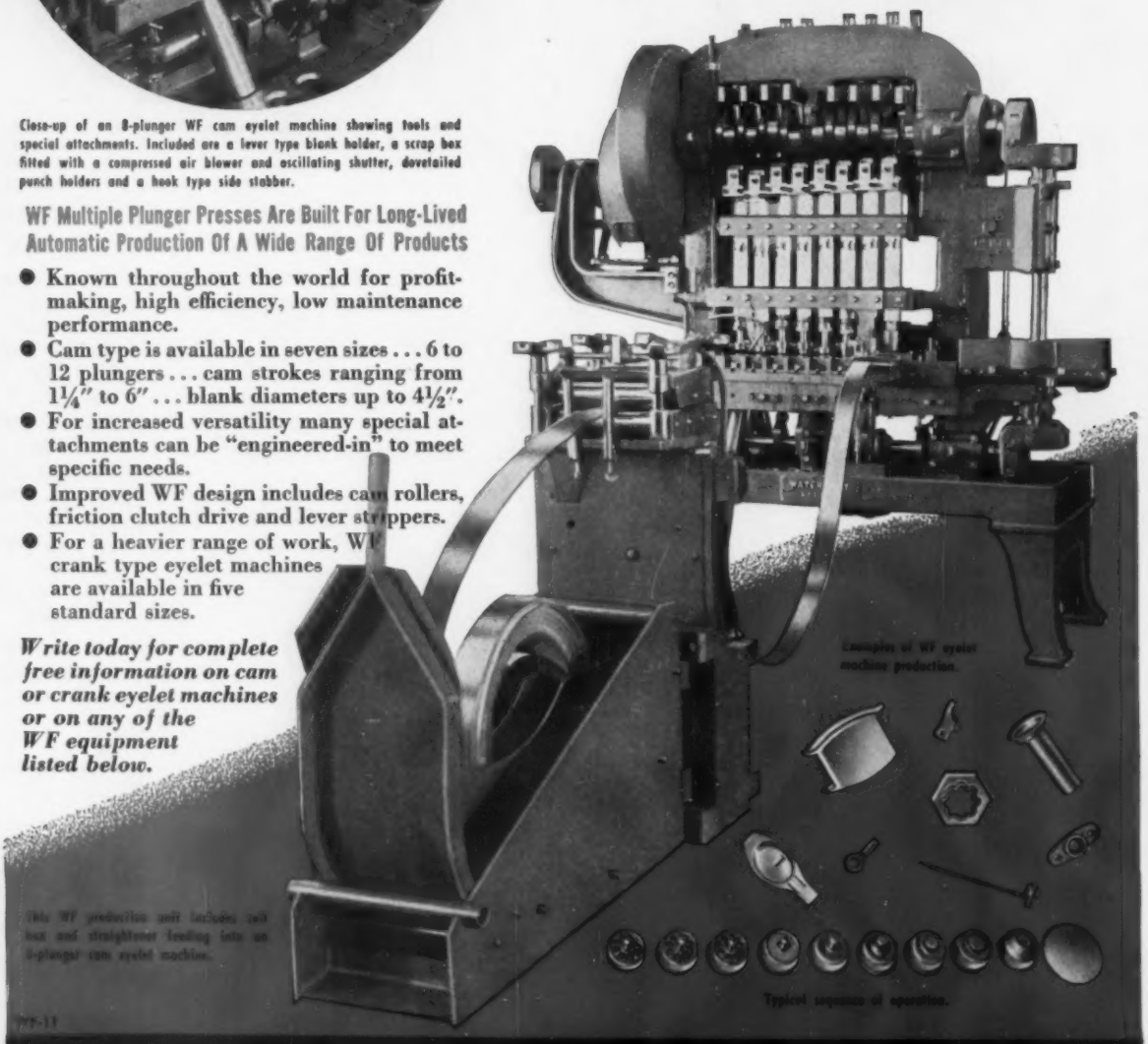
CLOSE-UP of versatile mass-production ability

Waterbury Farrel EYELET MACHINES

WF Multiple Plunger Presses Are Built For Long-Lived Automatic Production Of A Wide Range Of Products

- Known throughout the world for profit-making, high efficiency, low maintenance performance.
- Cam type is available in seven sizes . . . 6 to 12 plungers . . . cam strokes ranging from 1¼" to 6" . . . blank diameters up to 4½".
- For increased versatility many special attachments can be "engineered-in" to meet specific needs.
- Improved WF design includes cam rollers, friction clutch drive and lever strippers.
- For a heavier range of work, WF crank type eyelet machines are available in five standard sizes.

Write today for complete free information on cam or crank eyelet machines or on any of the WF equipment listed below.



Examples of WF eyelet machine production.

This WF production unit includes coil feed and straightener feeding into an 8-plunger cam eyelet machine.

Typical sequence of operation.

WF-11

WATERBURY FARREL FOUNDRY & MACHINE CO. • WATERBURY, CONN.

Offices: Chicago, Cleveland and Millburn, N. J.

WATERBURY FARREL FOUNDED 1851

POWER PRESSES — Crank, Cam and Toggle; also Rack and Pinion Presses • Eyelet Machines • Multiple Plunger Presses • Horizontal and Hydraulic Presses, etc. **MILL MACHINERY** — Rolling Mills: Strip, Rod, Wire Flattening, (For Ferrous and Non Ferrous Metals) • Also Slitters • Straighteners • Cut-off Saws • Coilers • Winders, etc. **WIRE MILL EQUIPMENT** — Continuous Wire Drawing Machines (Upright Cone and Tandem) • Wire Flattening Mills • Chain Draw Benches • Pointers • Swagers • Bull Blocks • String-up Machines • Spoolers, etc. **COLD PROCESS BOLT & NUT MACHINERY** — Headers (all types) • Rivet Machinery • Trimmers • Thread Rolling Machines • Slotters • Nut Formers and Tappers, etc.

Our challenge stands

—anything that can be made of steel sheets can be made of

WHEELING

SOFTITE®

Galvanized Sheets

Believe it or not, this galvanized recessed ceiling light reflector housing was made by spinning. *"Impossible,"* you say? *"Can't be done with ordinary galvanized steel"?*

You are right! It *isn't* made of ordinary galvanized steel.

It's made of Wheeling SOFTITE, the tightest-coated galvanized sheet yet produced. So tight it won't chip, crack, flake or peel no matter how severely it is formed. It even takes *spinning* in its stride. In fact, *anything* that can be made of steel sheets can be made of Wheeling SOFTITE.

That's SOFTITE . . . made by the same company that developed Cop-R-Loy, the original copper-bearing steel pipe . . . and DUCTILLITE, the original cold reduced tin plate. Now SOFTITE, the ultimate in ductile, tight-coated galvanized steel sheets . . . a product of Wheeling Steel Corporation, Wheeling, West Virginia.

IT'S WHEELING STEEL

District Offices — Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Houston, New York, Philadelphia, St. Louis, San Francisco

Designing a new wire product?

Call American Steel & Wire!

Steel wire comes in so many different grades, shapes and finishes that it isn't easy to keep them all at your fingertips.

For this reason, we suggest that you give your American Steel & Wire representative a chance to help with new designs while they are still on the drawing board. He may be able to suggest 1) a more economical wire, 2) a wire that will fabricate more easily or 3) a slight design change that will simplify production or lower the cost of the raw material.

At AS&W, we *use* a lot of wire in our own plants; and have learned many little tricks that are yours for the asking. Just call your American Steel & Wire representative.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN MANUFACTURERS WIRE

USS

AMERFINE—*high quality fine wire.*
AMERSPRING—*music steel spring wire.*
AMERTEMP—*heavy-duty oil-tempered wire.*
AMERLOY—*alloy heading wire.*
AMERHEAD—*uniform heading wire.*
AMERSTITCH—*extra-tough metal stitching wire.*

UNITED STATES STEEL

Eriez Permanent Magnets to CONVEY... HOLD... CONTROL

offer new automation advantages

Famous for years as magnetic separators for industry, ERIEZ HI-POWR Permanent Magnets have presented many ideas in automation to the metal-working industry. Powerful enough to stop moving metals, these magnets can also convey pipes, tubes, conduits, sheet metal, etc., at high speeds to maintain peak production. Other advantages include: faster pickup, more positive movement, less conveyor space needed, less product damage caused by slippage and sag, elimination of electric motors. *All Eriez Magnets are non-electric, self-contained. They have no wires or attachments. Alnico V magnets are guaranteed forever. There is no operating cost; first cost is the only cost.* Eriez also produces a full line of ***HI-VI Vibratory Feeders and Unit Vibrators.*** Heart of this unique equipment is a lifetime-powered Alnico V magnetic element which produces an exclusive 2-way action that provides broader operating ranges with less power consumption. Rectifiers are completely eliminated. HI-VI units are lightweight, easily installed, need no lubricants, have no friction-producing parts to wear.

Write for Big New "MAGNETS FOR METAL WORKING" Bulletin

Magnetic ideas from ERIEZ

ERIEZ HI-POWR MAGNETIC SEPARATORS ERIEZ HI-VI VIBRATORY EQUIPMENT

AND HOLDING ON BY A MAGNET. There's quite a drop beneath this worker . . . but he's in no danger. He is holding on by a permanent-powered Eriez Magnet. This idea of permanent dependability and herculean power now offers the metal working industry many new ideas for automatic control and conveying of steel. Hundreds of other production problems have also been solved by the use of many types of Eriez Permanent Magnets designed to separate, retrieve and purify.

ERIEZ SHEET FANNER MAGNETS. Here's the magnet to speed up sheet metal handling and increase production. Slow, costly hand separation is completely eliminated . . . no more double feeding, no scratched surfaces, no cut fingers. An Eriez Sheet Fanner Magnet placed next to a pile of sheet metal *automatically* lifts the top sheet into the air, allows fast, safe removal. When this sheet is removed, the following one automatically rises. Ideal for irregular, odd-shaped sheets. Available in five strengths.

ERIEZ SMALL-DIAMETER MAGNETIC ROLLS (flat-faced). These powerful, permanent magnetic rolls are destined to play a major part in plant automation. Installed either singly or in groups, they are used for feeding, conveying and spot control of sheet metal and they assure absolute control during such operations as baking, painting, trimming, etc. They eliminate drifting, untrue cuts, cobbles . . . reduce downtime and rejects. They permit automatic feeding of stock for cutting, punching and shearing operations. Rolls can be coated for special needs, or chrome plated for longer wear. In 2½", 4", 4⅜" and 5" diameters. Easily installed on present systems.

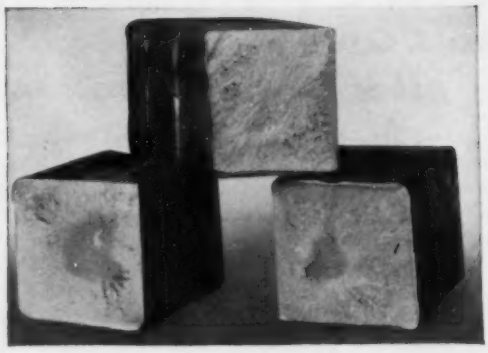
ERIEZ V-TYPE MAGNETIC PIPE CONTROL ROLLS. These V-grooved rolls are used to control and convey pipe from one location to another, either horizontally, vertically or up steep inclines at speeds that permit capacity production. They decrease take away time, make for shorter conveyor lines, and eliminate many direct drive rolls and motors. Positive hold prevents rebound, assures absolute control during all operations such as cut-off, reaming and facing, coupling, threading, and conveying through coating operations. Available for medium and heavy duty.

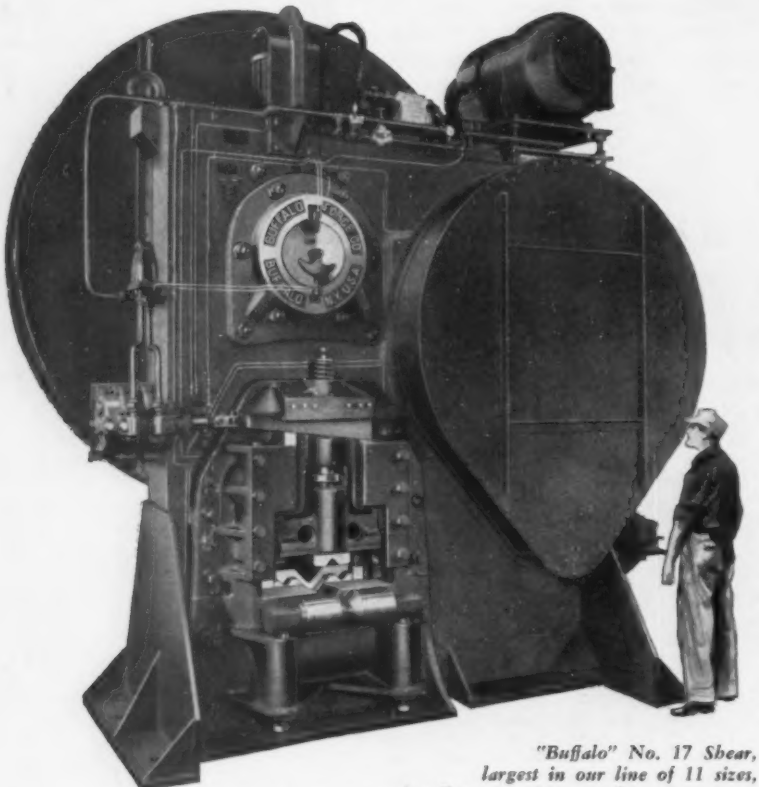
ERIEZ CONTROL PLATE MAGNETS (flat-faced). Designed for installation under fast-moving belts, powerful plate magnets are used to control moving sheets and keep them in proper position during conveying operations. True feeding into machinery is assured, and there's never a chance of flopping or "take-offs." Constant magnetic power prevents sheets from damaging each other, reduces rejects and waste. Available in various sizes and strengths, in widths from 4" through 72", in 2" increments. Readily adaptable to existing conveyor lines.

Eriez "Magnetic Ideas" can help you. Eriez factory-trained field men, backed by extensive laboratory and engineering know-how, will be happy to study your particular metal handling problem and offer helpful "Magnetic Ideas." Our representatives are always glad to work with your engineering department or consulting engineers on any problem, large or small. For additional information concerning magnetic problems in the metal working industry, write for new bulletin B-207. Address Eriez Manufacturing Company, 100K Magnet Drive, Erie, Pennsylvania.

CLEAN-CUT BILLETS

FOR BETTER FORGINGS AT LOWER COST





"Buffalo" No. 17 Shear, largest in our line of 11 sizes, handles up to 10" rounds or 9" squares at 6 strokes per minute. There's a "Buffalo" Shear for your operation!

With "Buffalo" Billet Shears, the knives penetrate only 3/16", causing a sharp, clean *fracture.* Since most of the "cut" is actually a fracture, there is no molecular disturbance, as with sawing or burning. Visual inspection for porosity is greatly facilitated.

. . . And in these powerful machines you get "Q" Factor* features such as "power" lubrication—rigid arc-welded steel plate frames—air operated clutches, counterbalance and hold-down — that assure you many years of profitable service with almost negligible maintenance. Write today for Bulletin 3295-C for all details.

"BUFFALO" BILLET SHEARS not only cut your forging stock to length squarely and accurately at production speeds, but result in better preparation of the stock.

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

BUFFALO FORGE COMPANY

492 BROADWAY BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING BENDING

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

Tubemakers –

NOW STRIP STEEL BY THE MILE

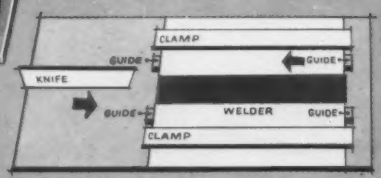
for continuous mill production!

The "MPM SHEAR WELDER" is "a natural" for increasing output and reducing coil end scrap loss.

Perfect welds are a result of positive guiding and clamping, right at the weld area. *(See diagram below.)* Both shearing and welding are done at the same station.

The "MPM" is the fastest, most accurate and compact machine of its kind, that's why tubing manufacturers prefer them over any other type. They are available in a complete range of sizes for any tube mill application. Other types are available for joining strip or sheets of any metal.

Metal Processing Machine Co.
Subsidiary of The McKay Machine Co.
YOUNGSTOWN, OHIO



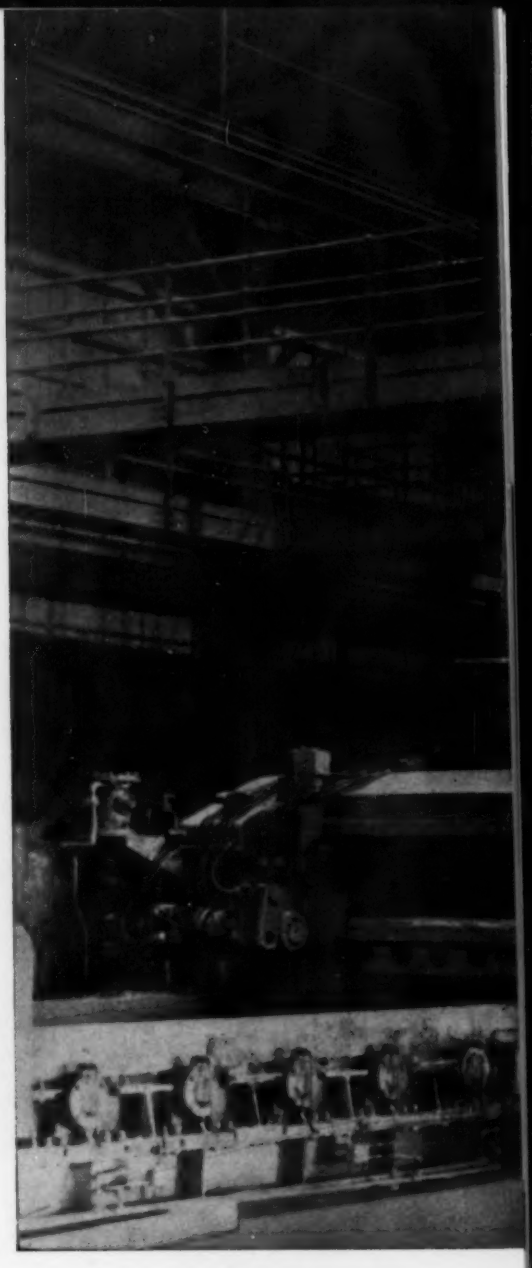
10092

BLAW-KNOX

makes what it takes

to hot roll high-tonnage

top quality sheet



This CONTINENTAL 80-inch, 6-stand continuous hot strip mill in the United States Steel's Gary Sheet and Tin Mill was designed and engineered for heavy duty and high-speed finishing. It is well-known throughout the industry for excellent tonnage performance and quality.

In addition to these large mills, Blaw-Knox builds single-stand reversing hot strip finishing mills, complete with all auxiliaries.

Blaw-Knox designs and builds *complete* rolling mill installations—assumes undivided responsibility from preliminary engineering to satisfactory operation. At any time we'll be glad to discuss your plans with you.

BLAW-KNOX COMPANY
Foundry & Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

Complete rolling mill installations . . . including all auxiliary equipment . . . for ferrous and non-ferrous metals

Hot strip mills • cold strip mills • slabbing mills • temper mills • universal mills • plate mills • blooming mills • structural mills • rail mills • billet mills • rod mills • merchant mills . . . roll lathes • chippers • special machinery • and complete auxiliary equipment

50th Anniversary
BLAW-KNOX
1906-1956

CONTINENTAL

ROLLS—Iron, alloy iron and steel rolls for all types of rolling mills.

CONTINENTAL 80-inch continuous hot strip mill in the Gary Sheet and Tin Mill of the United States Steel Corporation.

WELDMENTS—fabricated steel plate, or cast-weld design.

CASTINGS—carbon and alloy steel castings from 20 to 250,000 pounds.

Check SANDVIK'S four point quality when you specify SPRING STEEL

- ✓ HIGH FATIGUE LIFE
- ✓ FINE SURFACE FINISH
- ✓ UNIFORM SIZE
- ✓ CLOSE TOLERANCES

When you have a spring steel application that calls for these properties in more-than-usual degrees, check with SANDVIK. You'll most likely find that there's a SANDVIK steel that will give you exactly the kind of spring performance that you want.

SANDVIK steels are made from the purest ore obtainable by carefully controlled processes. Charcoal of low phosphorous and sulphur content is used exclusively in the smelting. This inherent purity is the basic reason why SANDVIK steels have been meeting the high physical demands of a wide variety of special uses for over a quarter of a century.

You can get SANDVIK cold-rolled, high carbon or alloyed, spring steel

- annealed, unannealed or hardened and tempered
- with bright finish or blue or yellow polished
- with round edges or square edges
- in a wide range of thicknesses from .001" up.

Phone or write for further information and current stock lists. SS-22

SOME SANDVIK SPECIALTY STRIP STEELS

Band Saw Steels: Wood, Butcher and Metal · Clock and Watch Spring Steels Compressor Valve Steel · Conveyor Belting · Doctor Blade Steel · Feeler Gauge Steel · Knife Steels: Art, Surgical, Textile, etc. · Magnetic Sound Recording Tape Piston Ring Segment and Expander Steels Razor Blade Steel · Reed Steel · Shim Steel · Sinker Steel · Spring Steels · Textile Steels · Vibrator Reed Steel.

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Here is the FASTEST KNOWN METHOD

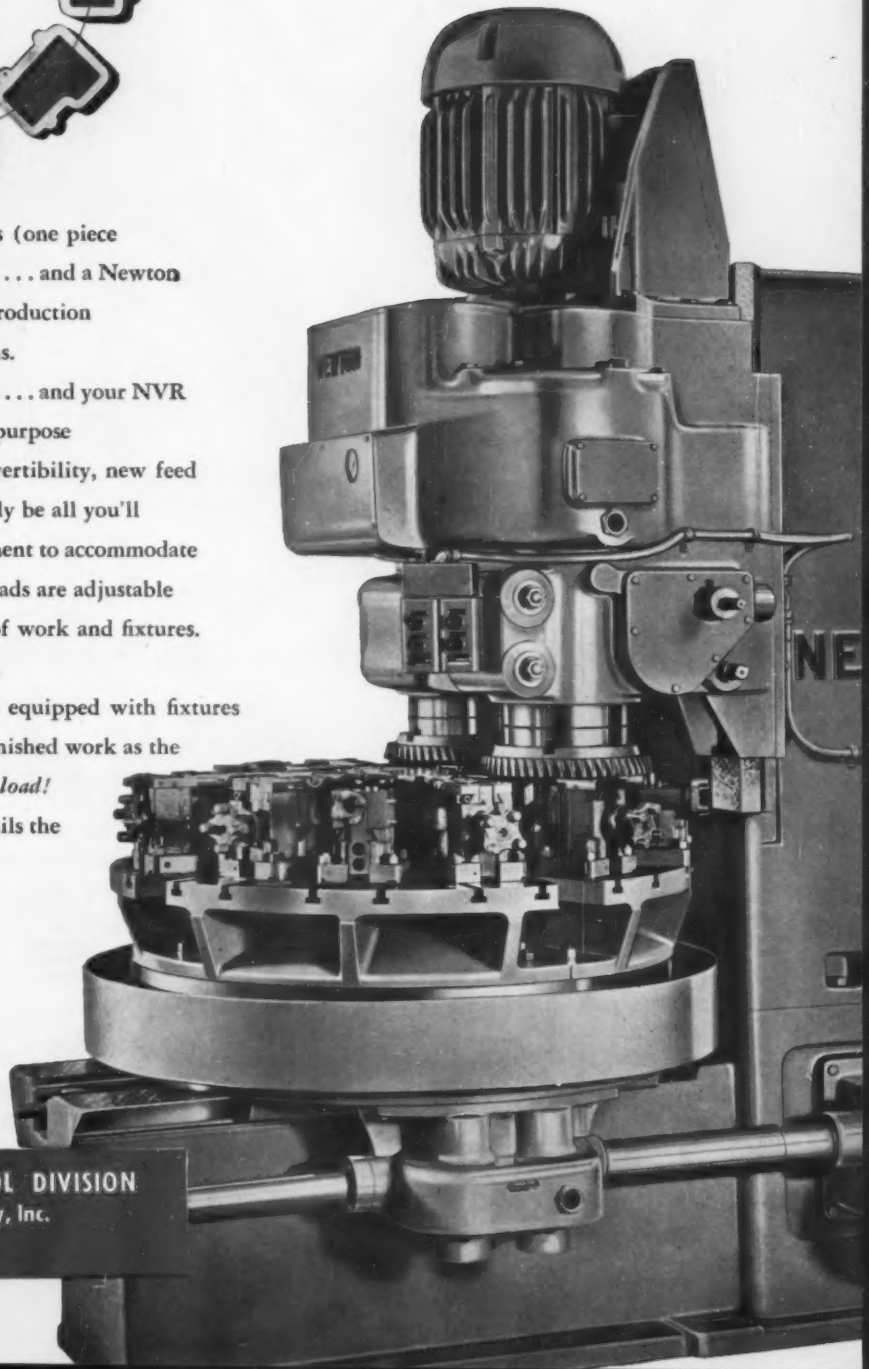
of milling the flat surfaces of repetitive pieces

Mount your fixtures on base plates (one piece or sectional) for quick changeability . . . and a Newton Vertical Rotary will give you mass production economy on comparatively short runs.

Change the design of your product . . . and your NVR won't land in the morgue of single-purpose machine tools. Thanks to high convertibility, new feed and speed pick-off gears will probably be all you'll need. Tables have in-and-out adjustment to accommodate cut-circles of different diameters. Heads are adjustable up and down for different heights of work and fixtures. Spindles are individually adjustable.

Newton Vertical Rotaries can be equipped with fixtures that clamp, unclamp and eject the finished work as the table turns. *All the operator does is load!*

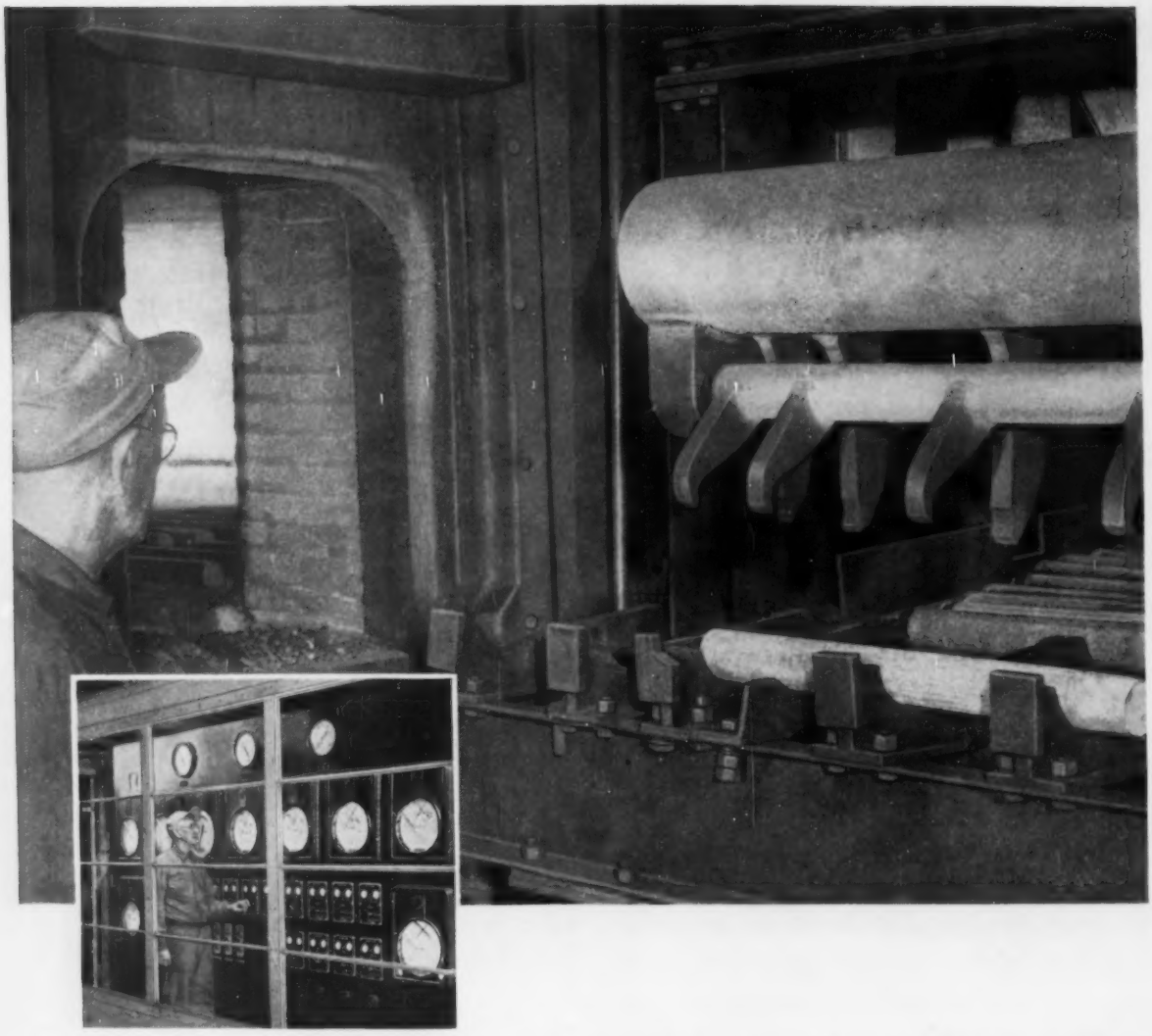
Write for bulletin 651, which details the advantages of these machines.



F/B

CONSOLIDATED MACHINE TOOL DIVISION
Farrel-Birmingham Company, Inc.
ROCHESTER 10, N. Y.

CM-4



REDUCING MACHINING COSTS OF HOLLOW PARTS

Uniformly-walled tubing minimizes the machining required to produce bearings, bushings, gears or other mechanical parts.

Mike Breit, the "heater" on this rotary billet furnace, in one of B&W's seamless tube mills, does much more than just control the piercing temperatures. He helps control uniformity of tube wall—for only a billet heated evenly to optimum piercing temperatures, with hot and cold spots completely eliminated, has the plasticity which permits piercing it into a seamless tube having dimensional characteristics required for economical production of machined parts.

Mike, who has helped produce thousands of tons of B&W Mechanical Tubing, heated in this specially designed rotary billet furnace, knows that it is a lot easier to pierce dimensional quality into a tube from the start, and certainly much more economical from the user's point of view, than to machine it in later. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

Seamless and welded tubular products, seamless welding fittings and flanges — in carbon, alloy and stainless steels

- more speed
- less waste
- greater accuracy

SIMONDS
ABRASIVE CO.

Cut-off wheels . . .

These thin, fast-cutting, resinoid-bonded wheels slice through the hardest-to-cut materials in seconds, giving more cuts per wheel — less stock waste — and essential accuracy in cutting lengths to close tolerances. They often eliminate finishing, too, since the ends they produce are smooth. Operating speeds from 10,000 to 12,000 s.f.p.m. (16,000 s.f.p.m. on specially designed machines.) Write for bulletin ESA-163 and name of distributor.

SIMONDS ABRASIVE COMPANY • PHILADELPHIA 37, PA.

Branch Warehouses: Boston, Detroit, Chicago, Portland, San Francisco. Distributors in Principal Cities
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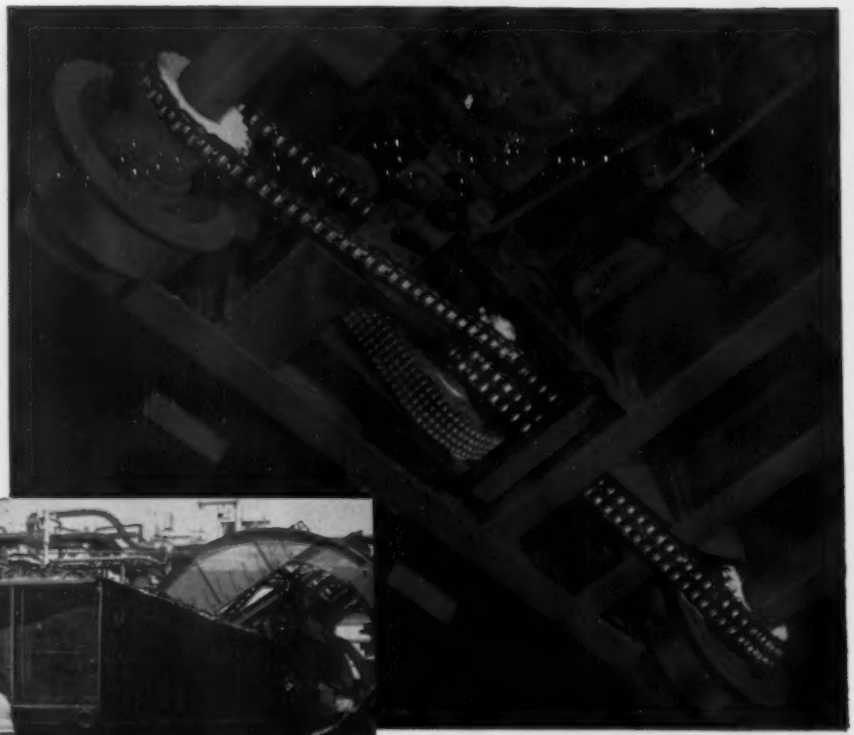
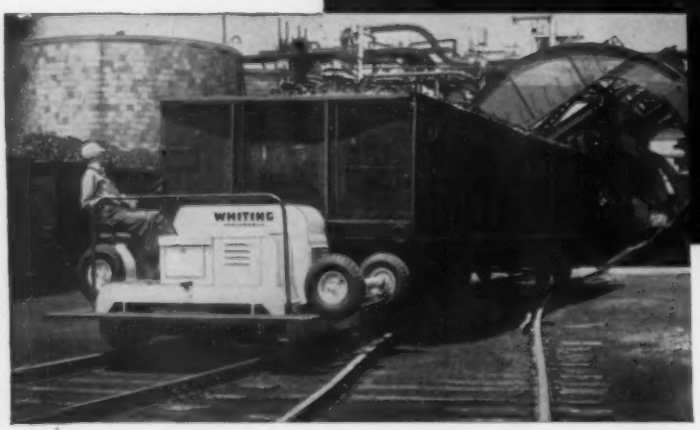
CALL YOUR SIMONDS DISTRIBUTOR

LOCAL STOCK
FAST SERVICE

Pint-size Whiting Trackmobile gets switch-engine power with Morse Roller Chain Drives

Morse Chain drives take tremendous loads, punishing operating conditions right in stride





View of Whiting Trackmobile undercarriage, showing Morse Roller Chain Drives. Employs single-, double-, and quadruple-width chain. Photo at left shows Trackmobile pushing loaded coal car to dumper. Rubber-tired wheels at ends lower to permit operation of vehicle off railroad tracks.

The Trackmobile, manufactured by the Whiting Corporation (Harvey, Illinois), does the work of a large locomotive; easily handles loads averaging 100 tons.

A major reason for the Trackmobile's rugged performance is its powerful drive system, featuring Morse Roller Chain and Sprockets. Morse quality-engineered products function perfectly under abnormal loads, and conditions such as cinders, dust, snow, ice, sand, and extremes of heat and cold.

Morse Power Transmission Products offer the utmost in efficiency, flexibility, long life, and economy of operation.

Literature, engineering help free

Call your local Morse Distributor or write today for Morse Roller Chain Catalog C 51-50. Skilled Morse engineers are ready to help you solve virtually any problem concerning power transmission equipment—Roller Chain, Hy-Vo Drives, Silent Chain, Sprockets, Clutches, and Couplings.

MORSE CHAIN COMPANY • A BORG-WARNER INDUSTRY • ITHACA, N. Y.

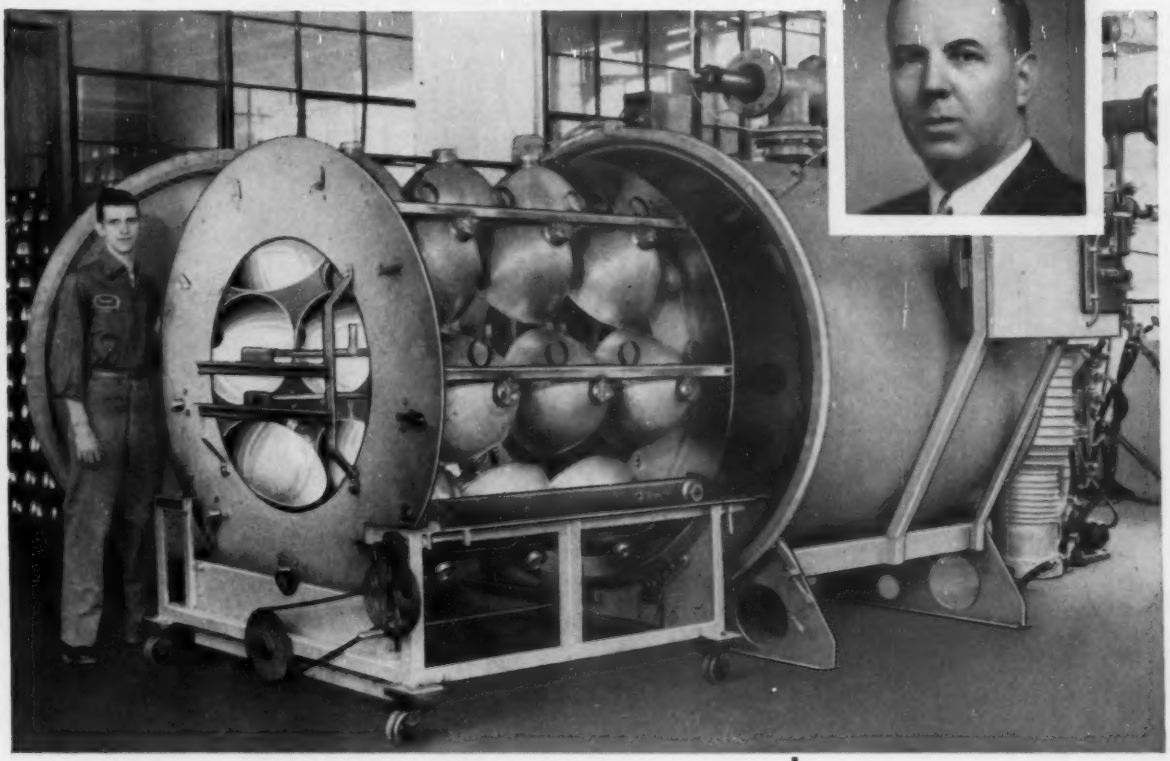
MORSE MORSE B-W *trademark **POWER TRANSMISSION PRODUCTS**

"Our Reflector Finishing Costs Dropped from $4.00 each to 95¢ each

WHEN WE CHANGED FROM ELECTRO-PLATING TO VACUUM COATING"

states

Mr. Elwood C. Rogers
President
Elwood Pattern Works, Inc.
125 N. East Street
Indianapolis, Indiana



NRC "Rapid Cycle" Vacuum Coater used to produce a new lower cost, higher quality finish on enlarger reflectors by Elwood Pattern Works, Inc., one of the country's leading photo enlarger manufacturer.

Other comments made by Mr. Rogers about the benefits resulting from his NRC "Rapid Cycle" Vacuum Coater:

"Customers are enthusiastic" . . .

". . . has eliminated all our troubles".

". . . gave us a reflector that would not tarnish or be affected by the heat".

"Our figures show this unit repays its total initial cost in less than 5 months".

You'll find NRC Vacuum Coaters have other important production advantages. They are easier to load . . . safeguarded from operator errors . . . faster to operate . . . less costly to maintain.

We have had years of experience in making and operating vacuum coaters. We can help you on all the problems involved in setting up a vacuum coating production unit — the size of the coater, method of loading, selection of lacquers, type of coating, and many others.

Get all the facts on the lower costs, improved quality possible with vacuum coating. Send coupon below.

NRC high vacuum products include: dehydrators, freeze driers, gas analyzers, impregnators, gauges, metallizers, pumps, valves, vacuum furnaces.

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NRC EQUIPMENT CORPORATION
A Subsidiary of
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Dept. 1610, Charlemont Street, Newton Highlands 61, Mass.

Please send me the "Rapid Cycle" Vacuum Coater Bulletin. ☐
Have your representative call ☐

Name.....Title.....
Company.....
Address.....
City.....Zone....State.....

Hollow Mill Maker finds

DBL-2
High Speed Steel

HARD, TOUGH and VERSATILE

The maker of these adjustable hollow mills required a steel that would give top performance in a variety of jobs—turning, tapering, facing, chamfering and trepanning. After thorough testing, Allegheny Ludlum's high speed DBL-2 was selected.

DBL-2 is an improved general-purpose high speed steel. It contains tungsten, molybdenum and vanadium in such proportions that it excels 18-4-1 for most applications. DBL-2's unusual combination of high hardness with toughness, its ability to hold a fine grain over a wide hardening range, and the fact that it easily machines many diverse types of stock, made it particularly well suited for this job.

In addition to these advantages, DBL-2 can be heat treated in the same furnaces and atmospheres as 18-4-1 without fear of harmful decarburization. These DBL-2 blades were heated to 2250 F., oil quenched and drawn twice at 1025 F. After heat treatment, blades easily machined such stock as aluminum, stainless steel, carbon steel, aircraft steel, plastics, bronze, screw stock, cast iron and brass.

There is an A-L tool steel to meet your toughest requirements. Call your A-L representative or distributor today . . . or write *Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.*

Write For Copy of
"CUTTING TOOL MATERIALS"
This 36-page illustrated booklet analyzes and compares types and covers grade selection for all major classes of cutting tools, etc., invaluable data for production men. Write for your copy today.

Address Dept. A-821

For complete **MODERN** Tooling, call

Allegheny Ludlum

WSW 5350 B

AL® FINE TOOL STEELS SINCE 1854

IN INLAND STEEL'S ROLL DEPARTMENT

New Mack-Hemp electronic contouring lathe removes metal at peak rates with .001" accuracy

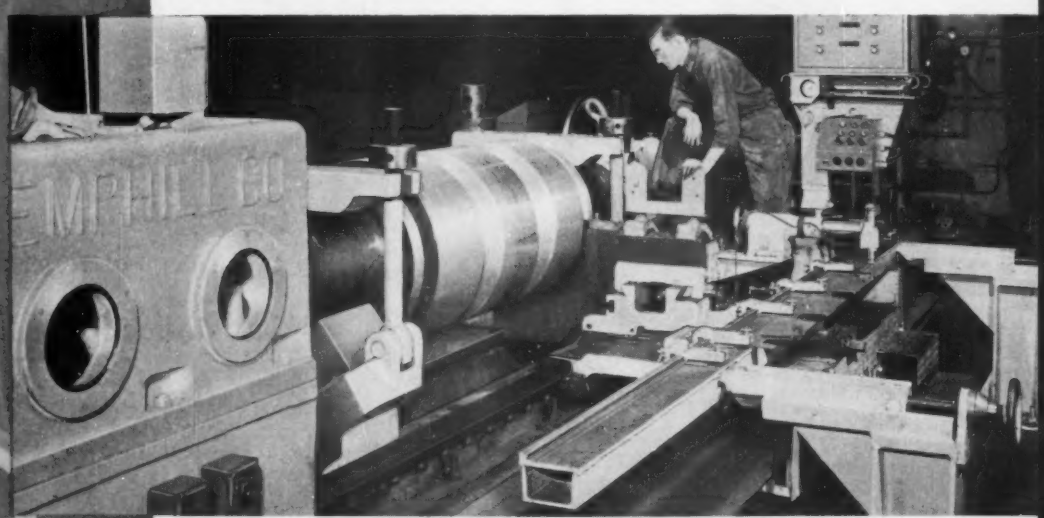
An electronic "pilot" guides this 48" Mackintosh-Hemphill contouring lathe recently installed in the Roll Department at Inland Steel Company's Indiana Harbor Works. It is so precise that the lathe can finish contours into a roll without deviating more than .001" from the pattern on the full-size template.

Stylus contact with the template controls the lathe's longitudinal- and cross-feed motors through electronic linkages. Thus, dual feed motion response of the tool holder carriage is instantaneous and smoothly continuous. Any conventional groove shape can be duplicated—it is even possible to make an accurate cut on a shoulder vertical to the axis of the roll.

But this precision of control is only one reason why the big lathe can turn shape rolls so rapidly. It has been designed and built to handle some of the heaviest torsional loads ever imposed on a lathe. For example:

It can operate continuously through a ⅞" cut depth with feeds between .060" and .100", and with spindle speeds up to 62 RPM. It can turn rolls or forgings 50" in diameter and 18 feet long.

If you are planning to install new large-roll turning capacity, you'll be wise to investigate these cost-cutting automatic contouring lathes. Write us today for complete information. They're available in 48", 60" and 72" sizes.



Inland's new 48" Mack-Hemp automatic lathe here is cutting passes into a new roll for a 3-high structural mill that rolls 15" I-beams. Hardness of the roll is 42 Shore.

MACKINTOSH-HEMPHILL
DIVISION OF
E. W. BLISS COMPANY

Makers of the rolls with the Striped Red Wabblers

MACKINTOSH-HEMPHILL DIVISION · PITTSBURGH · U.S.A. · BLISS

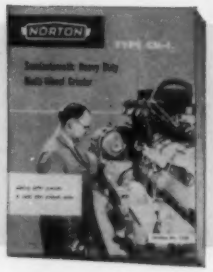
901 Bingham Street, Pittsburgh 3, Pa.

cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings
heavy duty lathes • steel and special alloy castings

CYLINDRICAL GRINDERS

10" Type CTU and 14" Type LCTU. Semiautomatic or plain. For plunge or traverse operations, from roughing cuts to finest finishing. Can take a wide range of multi-wheel mounts. In production line and job shop work these machines have doubled production, replaced several machines, eliminated extra operations. *Catalog No. 1787*

10" Type CV-4 and 14" Type LCV-4 Angular Wheel Slide. Semiautomatic machines that grind thrust surfaces and adjacent diameters in one fast, automatic plunge operation. They leave a concentric grain pattern in the thrust surface finish, assuring a better seal surface and appearance. *Catalog No. 1658*

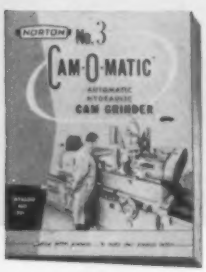


Type CM-1 Heavy Duty Multi-Wheel. Semiautomatic. Makes four or more cuts simultaneously, in a single plunge-grind cycle. Brings new speed, accuracy and economy to the grinding of multi-diameter parts. Many automatic features, including one-lever control. *Catalog No. 1550*

ROLL GRINDERS

Type C-2. A heavy duty machine, featuring faster cutting, quicker set-ups, easier operation. Available as a plain, semiautomatic or roll grinder. One-lever control of grinding cycle on the semiautomatic. As a roll grinder it includes the famous Norton tilting wheel head. *Catalog No. 1827*

CAM GRINDERS



NO. 3 CAM-O-MATIC Cam Grinder.* An automatic, hydraulic machine that is setting new standards for production, precision and finish. Grinds all cams and the camshaft eccentric successively and automatically, in one handling. Entire operation geared to split-second efficiency. *Catalog No. 191*

Check these guide books to

bigger grinding profits

Get the facts on how Norton grinding machines can benefit your production

In building the world's largest line of grinders and lappers — including automatic machines and machines for specialized operations — Norton offers you the greatest opportunities to modernize.

A representative selection of Norton machines is listed here, together with their catalogs. It will pay you to send for any catalog that concerns your grinding or lapping operations. Learn how replacing your obsolete equipment with new Norton machines will enable you to meet competition with the best production tools in the field. Learn also, how the Norton Lease and Financing Plans enable you to modernize, yet conserve your capital.

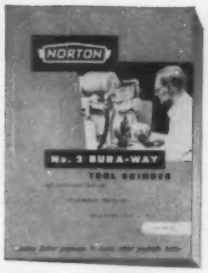
Ask your Norton representative for the literature you want, or write direct. And remember: only Norton brings you such long experience in both grinding machines and grinding wheels — to bring you the "Touch of Gold" that helps you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Mass.

CRANKPIN GRINDERS

Automatic Transfer Type. For completely automatic crankpin grinding — a news-making Norton *"first."* Locates, grinds, gages, transfers — all automatically — cutting costs on each crankshaft ground. Typical of Norton's rapid progress in automatic operation. *Catalog No. 1837*

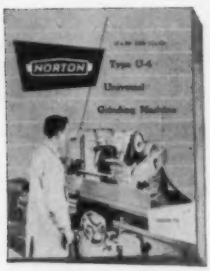
CUTTER AND TOOL GRINDERS

No. 20 Cutter And Tool Grinder. Fastest, most versatile machine in its class. Wheel head tilts 15° above or below horizontal and swivels through 360°, simplifying many difficult grinding jobs. Easy to set up, operate and maintain. *Catalog No. 189*



No. 2 BURA-WAY Tool Grinder.* Unequalled for grinding convex single point and form tools. Generates, produces and maintains relief angles constant in the direction of the feed. Duplicates the master tool form exactly. Extends the life of carbide-tipped and other tools. *Catalog No. 220*

UNIVERSAL GRINDERS



Type U-4, 12" x 36" and 12" x 48". Quick, easy set-ups plus fast grinding action save time and costs on a wide variety of external, internal, face and angular wheel-slide jobs. Simply turning a dial gives an infinite number of works speeds over its 40 to 400 rpm range. *Catalog No. 231*

LAPPERS

HYPROLAP Lapping Machine No. 48F.* An extremely fast, high production machine for single or parallel face flat lapping. Bonded abrasive laps produce work pieces free of grit. Three arrangements: plain, timed cycle; automatic continuous feed; semiautomatic continuous feed. *Catalog 1954*

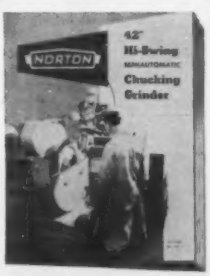
Vertical Lapping Machine No. 16FC. Outstanding productive capacity for flat work up to 3" x 5" and cylindrical work up to 3" diameter. Can produce optically flat surfaces and diameter tolerances in millionths, with fine repetitive accuracy. *Catalog No. 212.*

SURFACE GRINDERS

8" x 24" Hydraulic. Grinds plane surfaces speedily and economically, in large stock removal or close tolerance operations. Designed with both hand and hydraulic table cross feed. Convenient controls and easy accessibility reduce operating and maintenance time. *Catalog No. 190*

SPECIAL GRINDERS

42" Hi-Swing Semi-Automatic Chucking Grinder. For rapid, accurate grinding of large diameter, short parts, such as jet engine compressor wheels and similar components. Takes work held by chucks, face plates or special fixtures and permits grinding several surfaces without disturbing the set-up. *Catalog No. 1780.*



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GRINDERS and LAPPERS

Making better products . . . to make your products better

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From caddy carts . . to cameras . .

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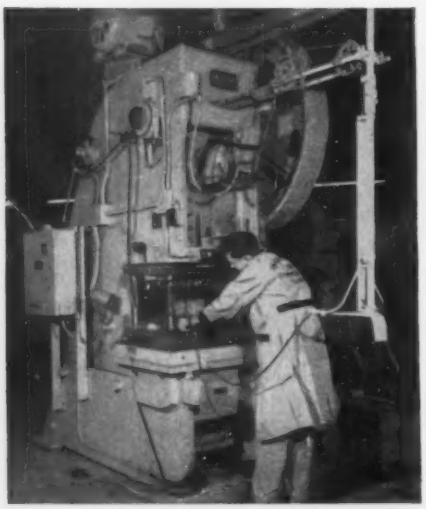
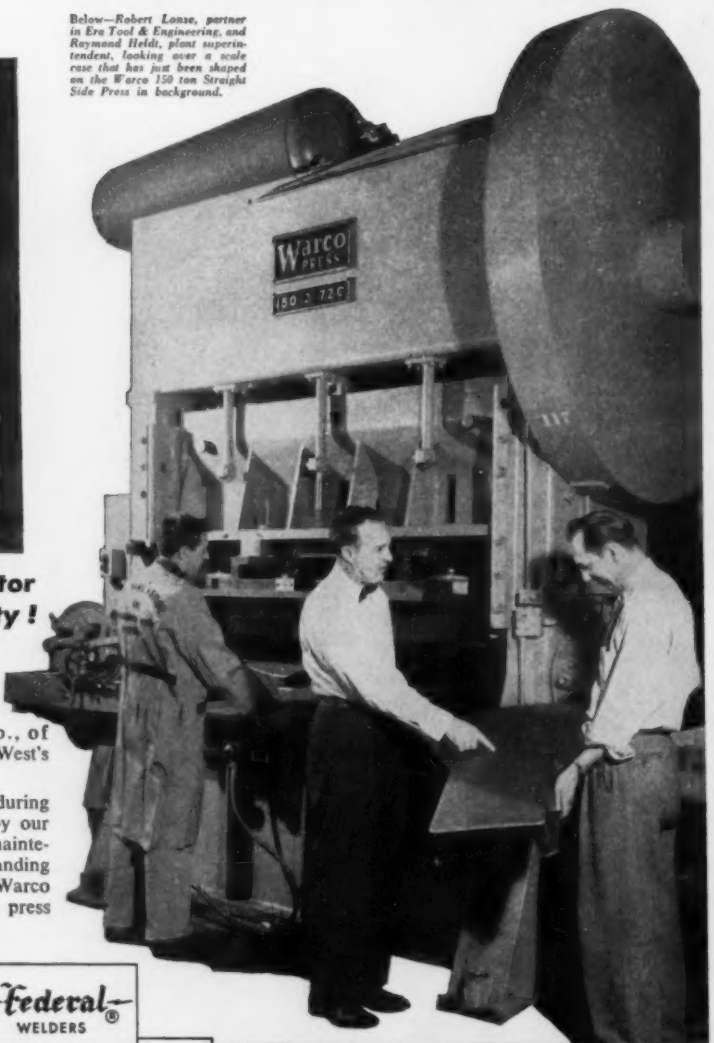
QUALITY PAYS OFF



Below—Robert Lonze, partner in Era Tool & Engineering, and Raymond Heldt, plant superintendent, looking over a scale case that has just been shaped on the Warco 150 ton Straight Side Press in background.



Leading Chicago metal fabricator likes Warco Press dependability!

"The demand for fast production of a wide variety of stampings calls for most dependable press equipment and that's why we like Warco Presses." This from Robert Lonze, partner in Era Tool & Engineering Co., of Franklin Park, Illinois, one of the Mid-West's leading metal fabricators.

"We first became acquainted with Warco during the war. The ease of operation acclaimed by our press operators, plus the extremely low maintenance requirements, were two of many outstanding features that thoroughly convinced us Warco builds rugged, practical and dependable press equipment.

"Whenever the need for an additional Press arises, we here at Era Tool will give Warco first consideration."

Federal® WELDERS

The Federal Machine and Welder Company

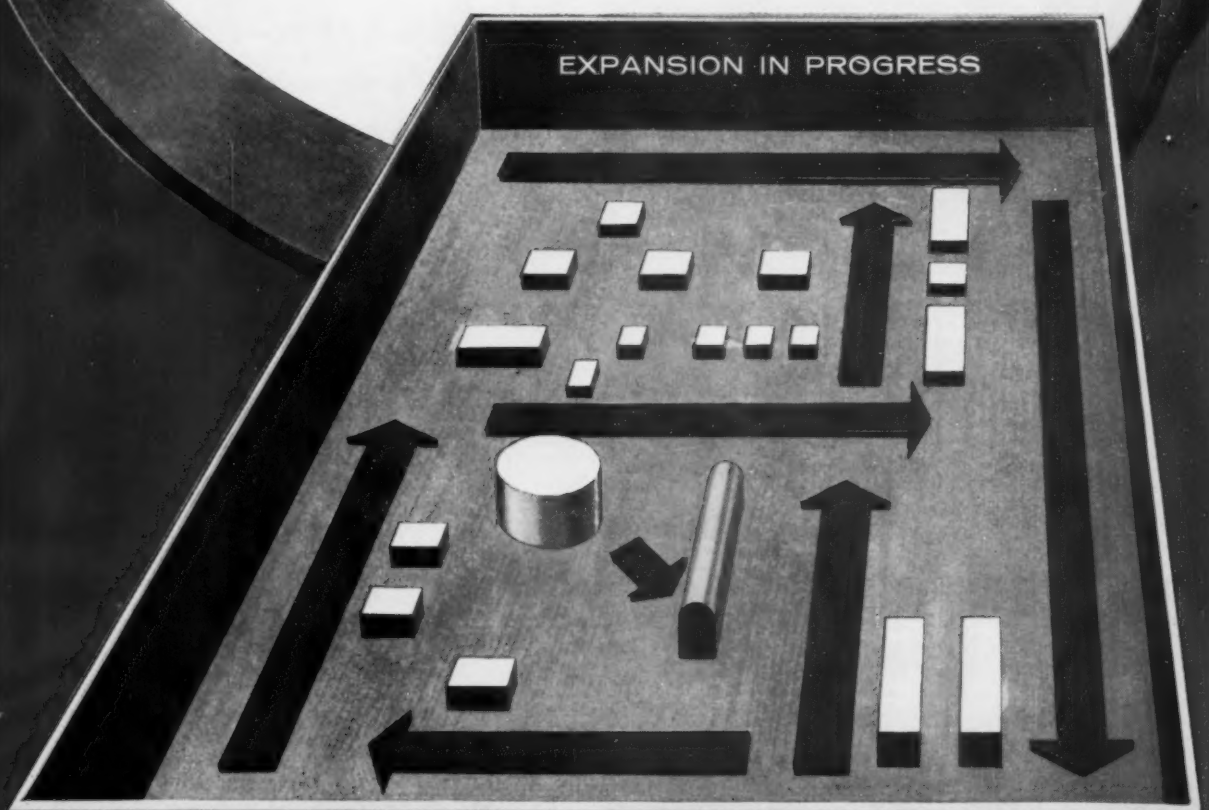
Warco® PRESSES

WARREN, OHIO

from planning to full-scale production . . . an outstanding Loewy-Hydropress "turn-key" job

Cooper Alloy Corporation's new plant in Clark, New Jersey, is now at full capacity rolling rings for jet aircraft. Loewy-Hydropress designed the plant, chose the site, supervised construction, specified, procured and installed all machinery and started up operation. So successful were the results that Cooper Alloy has retained Loewy to construct an addition to the plant.

This same integrated Loewy service is available to *you*. For any industrial facility, large or small, Loewy design, engineering and construction know-how can save you time and money . . . help you produce a better product. Write for your copy of illustrated bulletin L-144. Dept. 516, Loewy-Hydropress Division, BLH Corporation, 111 Fifth Avenue, New York 3, N.Y.



BALDWIN BLH LIMA-HAMILTON

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DIVISIONS: Austin-Western • Eddystone • Hamilton • Electronics & Instrumentation • Lima • Madsen • Loewy Hydropress • Pelton • Standard Steel Works

When history proves all progress starts with change

How can anyone watch new methods being adopted

Yet not seize those methods himself

WHY

don't you ask your LINCOLN ENGINEER about the LATEST welding advances to cut your manufacturing costs

If you build a product or machine why shouldn't it be made from welded steel?

If you build bridges or buildings why use rivets when welded designs cost less?

If you want to cut welding costs why not use Lincoln's money-saving methods for manual and automatic welding?

Why not call in Lincoln now?

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THE LINCOLN ELECTRIC COMPANY

Cleveland 17, Ohio

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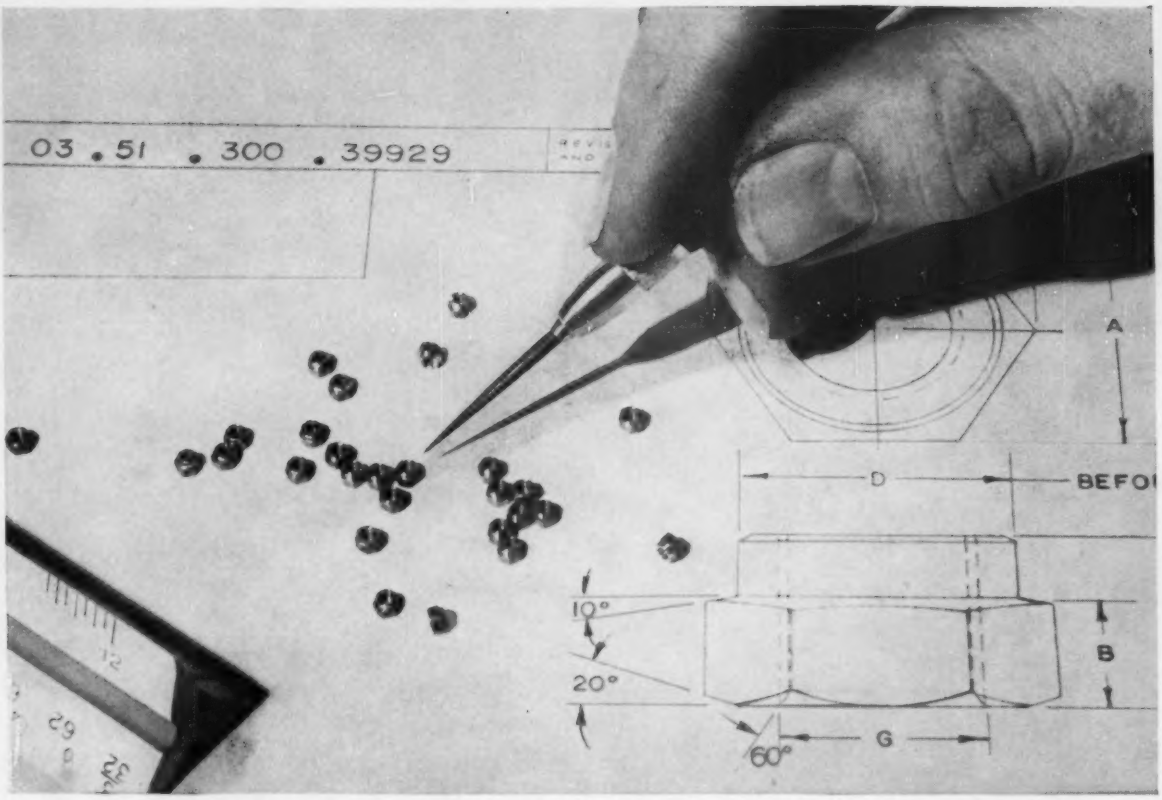
The World's Largest Manufacturer of Arc Welding Equipment



FLEXLOC MICROSIZE locknuts meet designers' needs for tiny precision nuts that retain strength and holding power in the smallest assemblies—servomechanisms, electronic and electrical equipment, all miniature devices.

New FLEXLOC Microsize Locknuts

Now available in Alloy Steel, Stainless Steel, Brass and Aluminum for lighter, more compact designs

SIZE	Across Flats		Shoulder Height		Across Corners	Height +.000 −.003
	MAX.	MIN.	MAX.	MIN.	MIN.	
0-80 NF-3B	.111	.107	.047	.042	.123	.075
1-64 NC-3B	.127	.123	.0635	.0585	.141	.090
1-72 NF-3B	.127	.123	.0635	.0585	.141	.090
2-56 NC-3B	.158	.153	.068	.063	.176	.105
2-64 NF-3B	.158	.153	.068	.063	.176	.105
3-48 NC-3B	.190	.183	.071	.066	.210	.120
3-56 NF-3B	.190	.183	.071	.066	.210	.120
4-40 NC-3B	.190	.183	.072	.067	.210	.120
4-48 NF-3B	.190	.183	.072	.067	.210	.120

SPECIFICATIONS: Available in brass (plain or cadmium plated) and aluminum (plain or chemically treated), for temperatures to 250°F; alloy steel, 18-8 stainless, for temperatures to 550°F.

New FLEXLOC Microsize locknuts are smaller and lighter than regular FLEXLOCS of the same nominal diameter. Wrenches of smaller size are used to install them. Mating joints or flanges can be designed smaller—with no loss in strength or convenience of assembly.

Microsize FLEXLOCS have all the advantages of larger FLEXLOCS. One-piece, all-metal construction—nothing to put together, come apart, lose or forget. Use them as lock or stop nuts—they stay put anywhere on a threaded member as soon as the locking threads are fully engaged. Uniform locking torques insure accurate preloading. There are no nonmetallic inserts to pop out or deteriorate. Moisture, dryness, oil won't affect these Microsize FLEXLOCS. Just screw them on. They lock and stay locked. Vibration won't shake them loose.

For complete information on Microsize FLEXLOCS, consult your authorized SPS distributor. Or write STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

STANDARD PRESSED STEEL CO.

FLEXLOC® LOCKNUT DIVISION SPS

JENKINTOWN PENNSYLVANIA

To get clean wipers at the tool crib, this lathe operator must make the hike, then stand in line. Dirty wipers in hand, he makes the trip at least once a day, takes several minutes to do it.

He has to waste 60 minutes a week

Easy to distribute

Really soak up oil . . .

Always a clean one handy . . .

Just toss 'em in the trash . . .

With a carton of 125 clean Scott Wipers at every workbench, daily wiper replacement is often unnecessary. One carton can last for days and a man has a fresh supply right at his fingertips.

. . . He stays on the job

The difference is . . . Scott Wipers

Check your production line. See how much time the men are forced to waste in order to keep supplied with fresh wiping material.

It adds up to more lost production time than you might think.

Scott Wipers are disposable. A man picks up a carton when he checks in . . . keeps it with him all day long. He uses one Wiper thoroughly—throws it away. Complicated distribution is ended. So is sorting, baling, and laundering.

And with fresh Scott Wipers there's no danger of hidden chips damaging men or metal.

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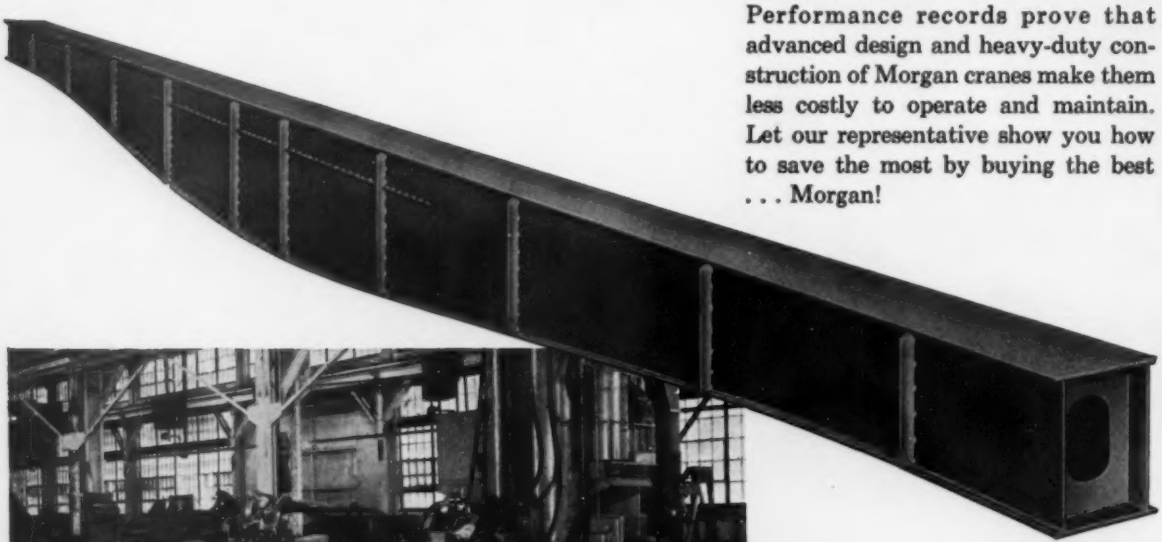
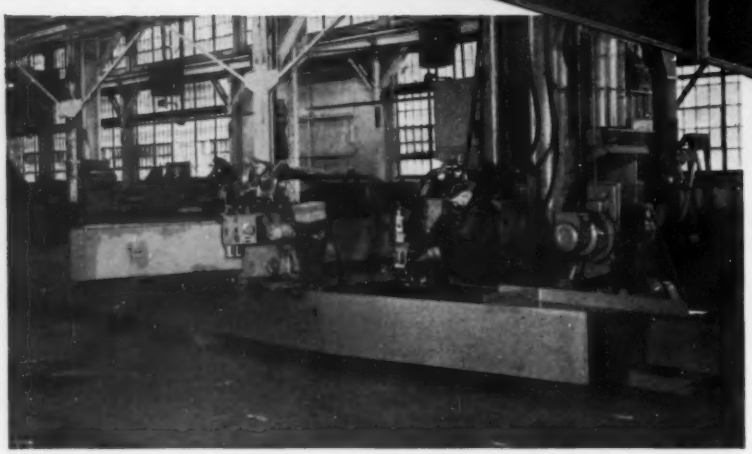
● MORGAN CRANES are stronger, more rigid . . . because girder joints and seams are welded automatically on the world's largest continuous welder. Casting imperfections and hand welding variables are eliminated with Morgan automatic welding. All joints are uniform and sound.

Crane drums, too, are welded automatically, making them stronger and lighter. Casting shrinkage voids are eliminated.

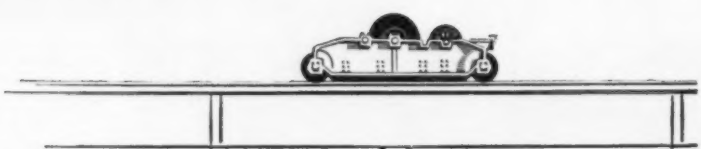
Morgan welders are qualified in accordance with A.S.M.E. and A.W.S. codes.

Performance records prove that advanced design and heavy-duty construction of Morgan cranes make them less costly to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!





Perfect welding penetration is obtained with Morgan's 120" per minute automatic welder. Two welding heads float vertically and horizontally along the track.



THE MORGAN ENGINEERING CO. *Alliance, Ohio*

The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, charging machines, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

Pheoll MANUFACTURING CO. *saves customers dollars by cold heading parts.*

A recognized leader in the cold heading process field, Pheoll Manufacturing Company, Chicago, Illinois, is constantly striving to simplify and standardize fasteners for their customers. Working closely with Keystone Steel & Wire Company, Pheoll Fastener Redesign Department has developed cold heading processes that in many instances have saved 20% to 50% in time and money over other methods of manufacture.

This is another example of how alert manufacturers, like Pheoll, are cutting costs, eliminating rejects and increasing die life with Keystone "XL" Cold Heading Wire. Your Keystone Wire Specialist will show you how the *flowability* characteristics, uniform high quality and economy of Keystone "XL" Wire can help you, too. Talk over your problems with him.

Keystone Steel & Wire Company, Peoria 7, Illinois

Pheoll Redesigns
Stud, Uses Keystone "XL"
to Cut Manufacturing Costs 50%

The heavy stud on the left was designed and manufactured from "XL" Cold Heading Wire by Pheoll to take the place of an equivalent part produced by other methods of manufacture. Savings to the customer amounted to 35%. The lighter stud is a further Pheoll design improvement on the same part that accomplished a savings of 50% over the original manufacturing process.

KEYSTONE STEEL & WIRE COMPANY
Peoria 7, Illinois

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COLD HEADING FACTS! Discusses methods, technical facts, wire requirements and other data.

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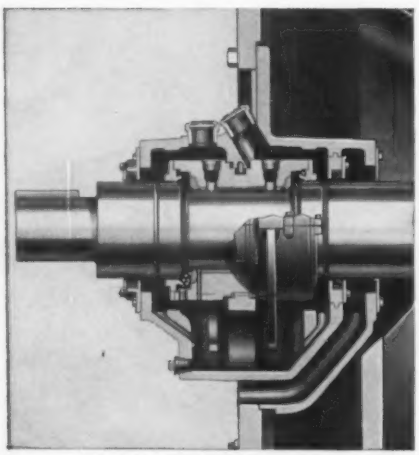
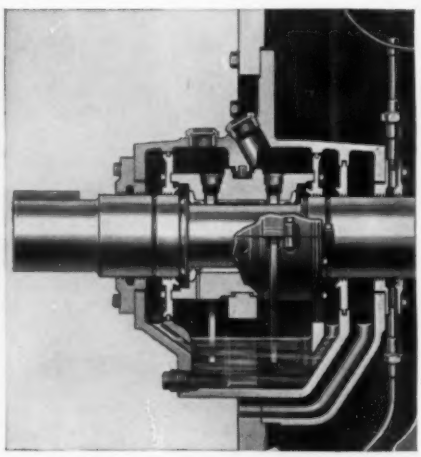
KEYSTONE
WIRE FOR INDUSTRY

NEW Bearing Design Means Better Motor Performance

Allis-Chalmers capsule-type sleeve bearings now perfected for complete motor line



Standard capsule-type sleeve bearing



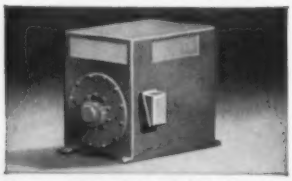
High speed capsule-type sleeve bearing

A new feature—an improved capsule-type bearing design—has been added to the Allis-Chalmers complete line of large end-shield bearing motors. This new bearing will give you better motor service, simplified maintenance and longer motor life through features like:

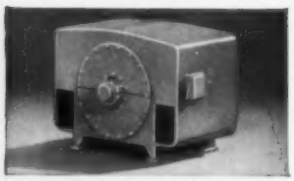
- Dust-tight, leakproof enclosure protects bearing from dirt, dust or abrasive materials.
- Venting system prevents oil leakage — keeps oil and vapor from getting into motor enclosure.
- Dual oil-rings insure bearing surface lubrication — either ring can adequately lubricate bearing.
- Split end-shield gives easy accessibility to winding and air gap — without disturbing capsule or bearing alignment.

Drip-proof or splash-proof cage motor

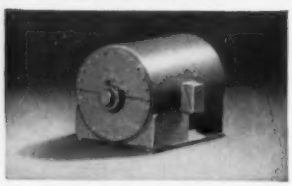
Synchronous or wound-rotor motor



High speed cage motor

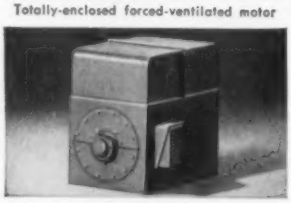


Weather-protected motor



Totally-enclosed fan-cooled motor

Totally-enclosed forced-ventilated motor



Water-cooled or inert-gas-filled motor

Capsule-type bearings are standard on these Allis-Chalmers motors.

You get **MORE** from Allis-Chalmers motors

More design and construction features — more application help. For complete information, contact your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

LIVE BETTER ELECTRICALLY

ALLIS-CHALMERS

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A-5032

NEWSFRONT

Aluminum Fabricators Branch Out

Basic aluminum producers note a trend among fabricators toward taking over a larger share of metal processing. In 1946, there were six non-integrated plants equipped for aluminum extrusion; today there are more than 130. It's estimated that for $250,000, a company can put in a 2000-lb extrusion press; turn out items like table edging, window frames, decorative trim.

Finds Tempering Temperature Fast

Presented at a recent technical conclave: what claims to be the most accurate, as well as the fastest, method for predicting the proper tempering temperature of steels to produce a given hardness. Like other methods, it's based on the composition of the steel. Accuracy's reported equivalent to about one point Rockwell C. Calculation time required with the method: About five minutes.

And Next Year, New Engines

Automakers have at least three new engines in the works for introduction on '58 models. Besides the powerplant for Ford's new "E" line car, to go into production next year, at least one other auto in Ford group will have a new engine. Chrysler Corp. is also reported planning a new engine for its Chrysler-line cars.

Push On Aluminum Foil Insulation

A major aluminum producer looks for aluminum foil sales to triple in next three years; expects growth to come through expansion of the home insulation market. Armed with new studies showing efficiency of the foil in home insulation, producer plans an all-out pitch for higher sales to home builders.

Coal: Riding A Comeback

Coal's comeback shows no signs of letup. European industrial purchasers are letting it be known they'll contract for all the coal that can be funneled through U. S. ports in 1957. To get around major bottlenecks (lack of unloading facilities at U. S. ports, lack of ships) one leading German steelmaker has bought up a Liberty ship outright. Greek shipping operators are chartering all the old freighters they can get to cash in on Europe's high pressure demand for coal.

Solution To Openhearth Spalling?

Iron oxide additions may be a partial answer to spalling of chrome-magnesite brick, now being used to an increasing extent in openhearth operations. Researchers seeking to improve the expensive refractory think maybe so. Positive answer will help resolve old economic problem of whether to run furnace at extreme heat for high production or throttle back temperatures for longer brick life.

Honeycomb Wings In Stainless?

Watch for developments soon on stainless steel honeycomb construction for jet airplane wings. With this construction, interior of the wing is built up like honeycomb for maximum strength, conduction of friction-generated heat. Steel producers argue stainless also has slight edge over titanium for use as wing surface material on newest plane designs.

Program Saves Steelmaker $150,000 Annually

A new IBM clerical control program now in use by Ford Motor Co. at its steel division is saving an estimated $150,000 a year minimum. The program is used for production planning, inventories, material handling, scheduling and shipping. Ultimately, the system's expected to make possible complete elimination of the annual physical inventory for rolling mill productive materials.

Tax Talk Stirs Up Critics

Eisenhower Administration's proposal to cut income taxes for smaller firms is stirring up criticism. Many Washington tax experts argue that the relief suggested (reducing the basic rate on $25,000 profits) would not mean much. Better suggestion, say the critics, would be to cut corporation tax rate from existing 52 pct to 47 pct levels, then cut top personal tax to afford relief to unincorporated firms.

NOW AVAILABLE...

Graph-air®

... an air-hardening tool steel that outwears others, machines 30% faster!

GRAPH-AIR®, latest addition to the Timken Company's line of quality tool steels, is an *air-hardening* graphitic tool steel. Uniform diamond-hard carbides in its structure make Graph-Air outwear other tool steels. And Graph-Air machines at least 30% faster—with the free graphite in its structure acting as a built-in lubricant.

Graph-Air hardens at 1450°F to 1525°F, or *200° to 300° lower than most other air-hardening tool steels.* Less costly heat-treating facilities are required. And because quenching is milder there's less distortion during heat treating, better stability. There's less surface scaling because heat treating temperatures are lower with Graph-Air steel.

Graph-Air can be made into more intricate sections because of its uniformity of hardening and its lower hardening temperature which minimizes distortion. It's made to order for blanking dies, or other steel parts which must take hard abuse.

Graph-Air is available in both solid and hollow-bar sizes. For more details, or specific recommendations from our metallurgists, write to: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN *Fine Alloy* **STEEL**

TRADE-MARK REG. U.S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING

AUTOMOTIVE: It Buys Big

As new cars go, so goes much of metalworking . . . Goal of 6.5 million cars means big business for suppliers . . . New Plymouth is traced from artist sketch through entire tooling program.

◆ ALL OVER the country, auto sales rooms are at a peak of activity as visitors flock to see the new 1957 models that are on display. Some of the visitors come to buy, some to look, and others are undecided.

The reaction of this group to Detroit's best offerings will determine whether 1957 will be a 6.5 million car year, as most auto leaders now predict; whether it might go beyond that figure for a really excellent year, or perhaps slump below 6 million.

Tension over reaction to new models is not confined to Detroit, but to broad areas of metalworking that supply the industry. To the varying degrees that auto business affects their production, auto sales mean the difference between feast or famine.

How the 1957 models go over means the difference, for example, between perhaps 18,721,880 tons of steel consumed by the auto industry, as in 1955, or 11,792,989 tons in 1954.

Hits Suppliers

It means the difference between perhaps 44 million sealed beam headlamps produced in 1955 and 32 million in 1954; or 6.8 million car radios turned out in 1955 against 4.1 million in 1954.

Although many segments of business and industry are not directly affected, and many that are are trying to diversify away from dependence on the auto industry, its consumption of goods and materials makes it a dominant factor in the entire U. S. economy.

Here are some facts that show how the last boom year (1955) affected metalworking in manufacturing the vehicles that in turn brought in $36 billion in motor vehicle sales.

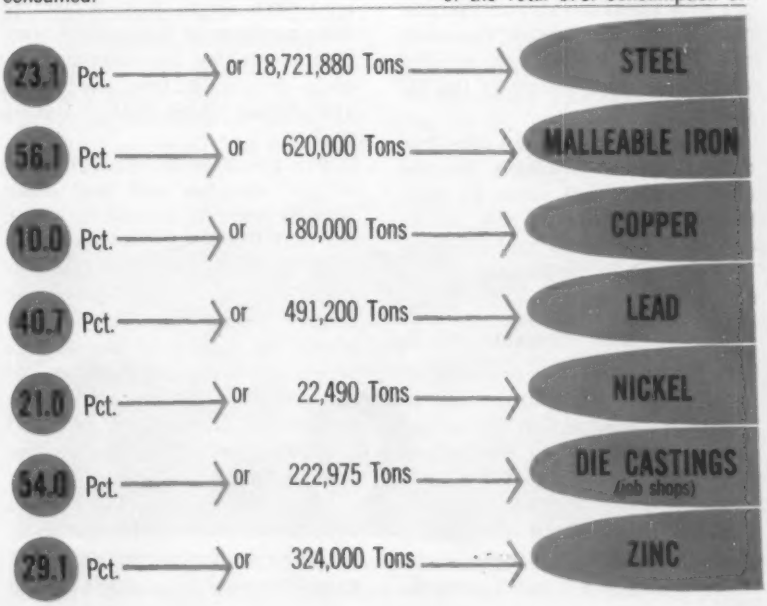
Facts and Figures

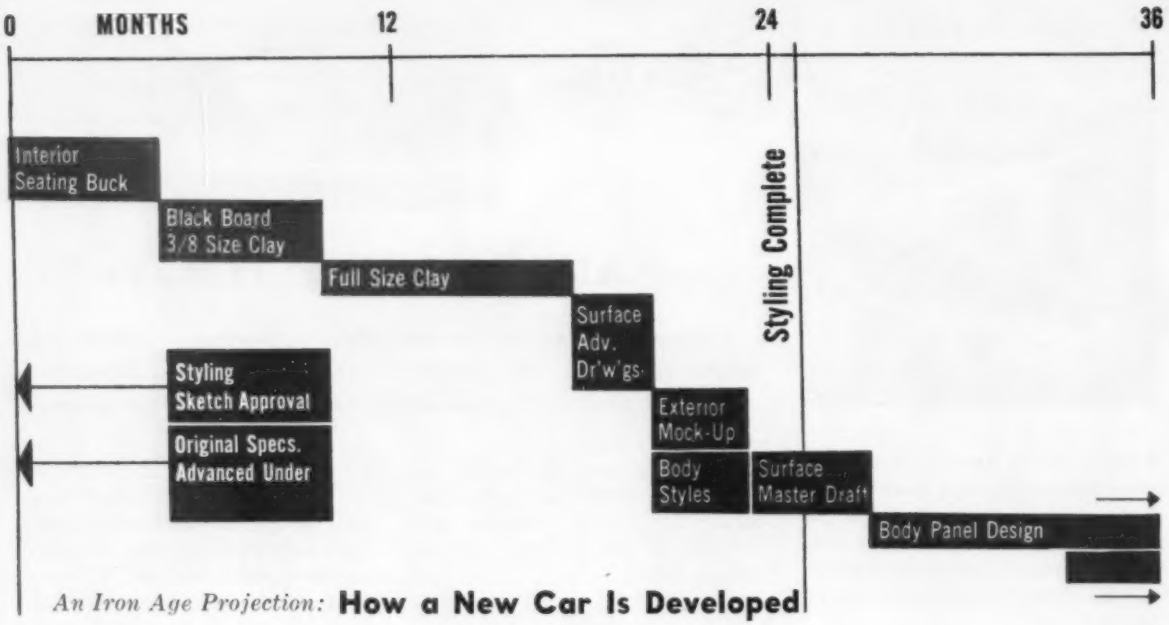
In steel alone, the auto industry consumed 1.46 million tons of steel strip, or 38.7 pct of all strip used in the U. S.; 3.3 million tons of bar steel, 31.6 pct of U. S. consumption; 11.75 million tons of sheets, or 49.3 pct; 2 million tons of alloy steel, or 38.6 pct; and 142,801 tons of stainless, 22.1 pct of all United States consumption.

In addition, automakers used 71.2 pct of all aluminum permanent mold castings, about 75 pct of all plate glass; 64.8 pct of all natural rubber consumed in the U. S.; 61.6 pct of all synthetic rubber consumed in the U. S.; 71.5 pct of all leather upholstery; 4 pct of all cotton; 59.6 pct, or 327 million lb of zinc die castings; 43.3 pct, or 117 million lb of aluminum die castings; and 37.5 pct, 1,950,000 lb of magnesium die castings sold by U. S. job shops.

Admittedly, 1955 was a big year

DETROIT: How Big a Customer?


In a boom year, (1955)
the AUTO INDUSTRY
consumed:
of the Total U. S. Consumption of:
23.1 Pct. or 18,721,880 Tons STEEL
56.1 Pct. or 620,000 Tons MALLEABLE IRON
10.0 Pct. or 180,000 Tons COPPER
40.7 Pct. or 491,200 Tons LEAD
21.0 Pct. or 22,490 Tons NICKEL
54.0 Pct. or 222,975 Tons DIE CASTINGS (job shops)
29.1 Pct. or 324,000 Tons ZINC



An Iron Age Projection: **How a New Car Is Developed**

—the all-time production record—and not likely to be challenged this year, or even perhaps in the near future.

That year, 7,920,000 cars and 1,249,000 trucks and buses were turned out. For 1957, predictions range consistently around 6.5 million cars and 1 million trucks. This would place it in the same range as 1950 and 1953, both considered boom years before the 1955 surge.

To reach that market, automakers have spent lavishly on the 1957 models, which altogether represent one of the biggest changeover years ever experienced in the industry.

No breakdown of machine tool expenditures is available, but the auto industry has spent an estimated $1.8 billion in new plants and equipment, all aimed at reaching, and probably bettering, the 6.5 million new car goal.

How Plymouth Did It

In the thick of this competitive fight is the Plymouth Div. of Chrysler Corp. which is trying desperately to regain its former third place in the industry, which it has yielded to Buick.

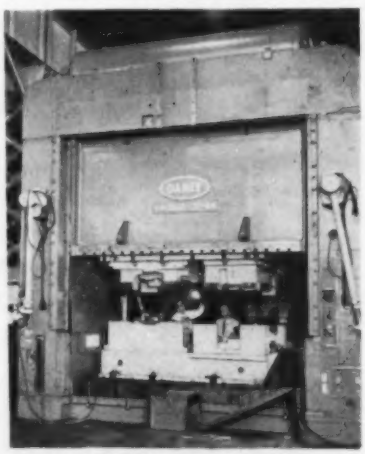
Just what Plymouth spent in its efforts to grab off a bigger share of the market is a company secret, but it is safe to assume that it got its share of the $300 million Chrysler Corp. spent in tooling up for its 1957 lines.

While the public is seeing the car for the first time this week, the new Plymouth, which Chrysler calls the K model, dates back more than three years when planning for the new model got under way.

At this time, Chrysler's top management held a meeting at the company's main offices in Highland Park, Mich. At this meeting were members of the product planning committee, top company officials, Plymouth Div. executives, and officials of the central styling studio.

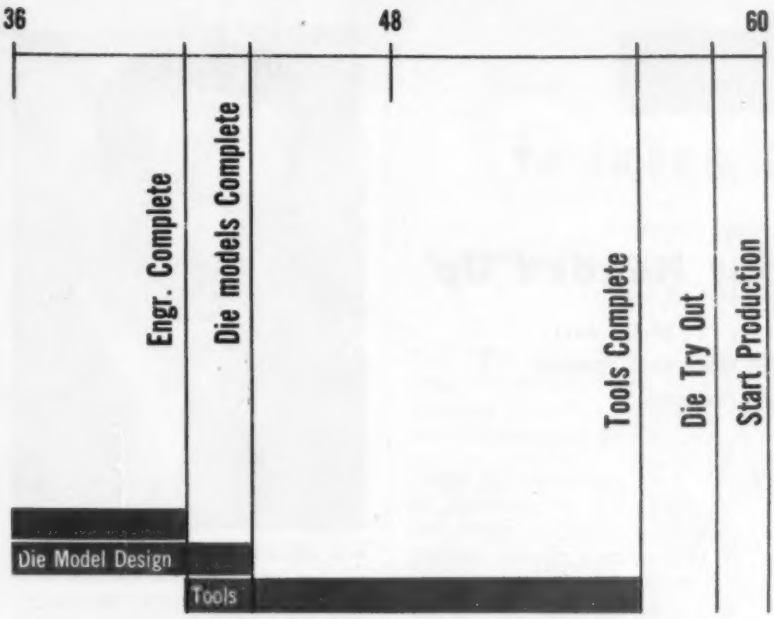
This group sifted through many artists' sketches and laid down broadly what it wanted to see in the 1957 Plymouth. Earlier it had been decided that the new car would have to be much lower and longer looking and that there would be a major increase in driver and passenger visibility. At the same time, the car would have to give the appearance of "bold fleetness," embodying the styling precepts of Chrysler Corp.

After this meeting, the stylists went to work to construct a number of $\frac{3}{8}$ scale clay models which were presented for approval to top management in late 1953. The small clay models are used for three reasons. First, they don't take as much time to build as full-size clay models. Secondly, flaws in design can be easily detected. Thirdly, full-size clay models are built after basic decisions have been made from the smaller models.



FINAL CHECK of a 24-ton die for the distinctive 1957 Plymouth rear.

One of these small models was approved at the meeting. Not as you see the car today, but close to it. Then, the stylists went back to their clay rooms and started modeling a full-size car.



Even while the scale models were being built, stylists were in constant touch with engineering and manufacturing staff personnel who could give advice from a tooling, manufacturing and cost standpoint.

By the summer of 1954, the full-size clay was presented to top management for approval. This was a critical session. Not only the clay model was up for approval, but the corporation also wanted a preliminary estimate on how much the car was going to cost.

Once the model was approved, the Plymouth program really started to roll in earnest. Engineers took over and designed a frame for the car. Because of its lowness, it was necessary to design a stronger frame with a dropped floor pan. In addition, a new front end torsion bar suspension, which took years to develop, was also introduced.

Once the frame design was completed, specifications and drawings for it were sent out to the various companies that make Plymouth frames.

In the meantime, the surface of the full-size clay model was transferred by means of templates for full-size body drafting work. As drawings and die models were completed, they were released to the corporation's supply divisions which started to make some of the dies. The supply divisions also determined which tools and dies should be purchased from outside tooling sources.

Prior to this point, Plymouth started to make decisions on whether to make or buy parts. This was a tremendous job. Because it is all new, Chrysler Corp. requires no less than 3400 dies for the K model. Not all of these are being used exclusively on the Plymouth as many tools are interchangeable with Chrysler's other car lines.

When an auto company starts on a new model program, it is always concerned with the timing of its tooling program. The dies that are large and intricate must be scheduled at the earliest possible time. In the case of Plymouth, the controlling factors from the time standpoint were the rear quarter panels, the inside door panels, the bumpers and several other major items.

A quick glance at the automobile will show you why. Because of the high swept rear tail fins, Plymouth found it necessary to make this design by splitting the rear quarter panels along the peaks of the fins. In addition to being more costly, it took more time to design and build the necessary dies. Bumpers on all cars are becoming more and more intricate every year. A look at the Plymouth front bumper will tell you why the tooling for this part become a controlling factor.

Timing Important

Tooling people like to think that a comfortable lead time for the design, construction and tryout of the tools required to build the major control items should be about 15 months. Although this is highly desirable, there are times when it does not work out in practice.

In Plymouth's case, the die building program was started early enough to coincide with production schedules. Not all the dies were started at the same time; their delivery dates were staggered with the start of production of the various models.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

FINISHED PRODUCT: 1957 Plymouth Belvedere is ready for the market where its more than three years of development will be tested in cold sales.

THE IRON AGE INTERVIEWS:

J. Donald Hanawalt

Magnesium Output Headed Up

1956 production pegged at 65,000 tons . . . Strike cost about 10,000 tons . . . But output still takes first upward move since 1952 . . . Room for more producers.

◆ **J. Donald Hanawalt is a vice president of Dow Chemical Co., and manager of its magnesium department. Mr. Hanawalt joined Dow Chemical Co. in 1931. He was appointed Dirrector of Metallurgical research in 1940 and took over the magnesium division in 1946.**

He holds 28 patents governing the production, alloying, purification and casting of magnesium.

Q. How much magnesium will be produced this year?

A. Output for 1956 should exceed 65,000 tons. This is less than the 75,000 tons we had predicted, but greater than the 61,000 tons produced in 1955. The 5-week strike at our Texas installation is the reason for the revised estimate. Our monthly output dropped from an average of 6000 tons during first half to about 1100 tons in July and 3300 tons in August. We expect last quarter production to recover to first half levels.

Q. What is the market outlook for magnesium?

A. We're looking for wider markets for magnesium — including high temperature applications in aircraft and missiles — to stimulate higher output. The industry should continue to grow over the next 10 years.

Q. Do you expect any new producers to join Dow and Alabama Metallurgical Corp. within the next 10 years?

A. The outlook certainly is bright enough to make it seem additional capacity will be necessary. An extension of growth curves established in the past few years would show that in 10 years magnesium consumption will be triple what it is today. This would indicate plenty of markets for two or more suppliers.

Q. Do you believe the major markets for magnesium will noticeably shift in the years immediately ahead?

A. We don't anticipate any decided shifts. On the contrary, we have every reason to believe that all magnesium's natural markets will grow along present lines. In 1954 and 1955 about 40 of every 100 lbs of magnesium produced were used structurally. But there's no indication that cathodic protection and alloying will decline in importance.

Q. Would a market shift, say a sudden increase in use by the aircraft industry, push the available supply to the critical limit?

A. No. The magnesium industry has shown itself to be extremely flexible. This is illustrated by the speed with which it multiplied output to meet the vastly-increased demand of World War II and Korea. Today, there is every reason to believe the industry is geared to keep pace with gradually or suddenly increased demand.

Q. What seems to be the probable direction of any possible price change? And what factors would be foremost in causing a change?

A. If inflationary factors, even mild ones, continue in our economy as in the past, all costs and prices are bound to rise along with purchasing power. But the important thing is not the increases themselves. Taken alone they can be deceptive. What matters is the relative price of a raw material or commodity compared with other similar raw materials or commodities. Such a comparison shows magnesium prices have been unusually stable. Percentagewise, they've increased less since 1939 than every other metal but one.

Q. Do you believe rolling mill technology is matching the present rapid progress of magnesium metallurgy?

A. Yes, definitely. Dow's Madison, Ill., rolling and extrusion mill is developing mill technology. We're perfecting techniques for coil-rolling magnesium sheet which will mean higher mill efficiency and a superior product.

Q. What magnesium product developments are most significant in the field of high temperature use?

A. Certainly of vital importance will be alloys with good structural characteristics between 500 and 800 degrees F. These alloys will run the gamut of structural forms — sheet, plate, forgings, extrusions and castings — and will depend for their desirable properties on the addition of thorium, zirconium, cerium and other rare earths.

Fairless:

Half a billion tons capacity by 2056.

Benjamin F. Fairless, president of the American Iron and Steel Institute, talked to steelmen of the year 2056. The occasion: Laying of a "cornersteel" at New York's stainless steel skyscraper, the 45-story Socony Mobil building.

The steel chest, sealed in the device to replace the traditional cornerstone, contains forecasts of Mr. Fairless and other industry leaders.

"Steel mills of future decades . . . will utilize sources of power, chemicals electronic controls and varieties of materials that we are just beginning to investigate," Mr. Fairless predicted.

Benjamin F. Fairless

"We expect that the industry of 2056 will have moved all the way to a continuous operation instead of a batch-type process," he continued. "Steel will be made by direct reduction of iron ore, using atomic energy. Iron ore will move in at one end of the plant and finished steel products will emerge at the other," forecast the head of the Institute.

"In all, looking into the future with its vast increases in world population, broad upsurge in standards of living, constant widening of the uses of metals, and immense strides in manufacturing productivity, we believe it is entirely possible that the steel industry you know will have achieved a capacity of half a billion tons a year."

CONTROLS

TANKERS: Controls Trigger?

Proposed tanker program could lead to allocation of plates and structurals . . . Chain reaction would affect turbines and boilers . . . Non-rated users would be hurt.

◆ IF THE proposed big oil tanker program gets the green light, government allocation of plates and structurals could be just over the horizon. Priorities would be in order, too, for turbines and steam generators to power the ships.

At least that's the way some Office of Defense Mobilization people are talking as the proposal to construct 50 large oil tankers—an outgrowth of the Suez Canal crisis—is weighed by policy makers in the Eisenhower Administration.

For plate and structural producers—and their customers—reimposition of controls would complicate an already-tough market situation. It would swing heavy tonnages of these products to ship builders and their suppliers at a time when shortages are forcing cutbacks and delays.

News Alarming

Says a veteran steel salesman: "What it would mean would be quota cuts for my customers, and they are already in a bad way. One of them has discontinued operations in its heavy tank division already."

"We are already working at 60 pct capacity due to shortages of plates and structurals," says a tank maker. "If we are cut back further — and we would be — it would be on wide plate and that is our most critical item."

A heavy automotive equipment manufacturer has this to say: "I was talking with my mill suppliers about this just this week. They tell me if quotas are begun my steel allotment will be lower than it is right now. And I am not getting enough plate as it is."

The story was the same from a construction equipment builder: "We have already had several shutdowns due to steel shortages, mostly plate, but some trouble with structural as well. We are using foreign plate, conversion plate and anything we can dredge up in the warehouses, and that's almost none."

Controls Grow

And controls have a way of mushrooming. Priorities for turbine manufacturers, for example, might lead to priorities for large shaft forgings and for heavy castings to assure their completion. Defense-supporting industries, such as freight car builders, probably would want to get on the bandwagon.

Getting the tankers built also might involve reactivation of wartime shipyards and turbine plants, say close observers of shipyard activity. They point out that every shipyard in the U. S. and throughout the world is tied up for at least two years with tanker construction.

Oil companies are booming tanker construction. In this country, 32 are under construction. Total tonnage is 970,000, which means they are all big ships. Worldwide, there are probably over 200 being built.

Shortages Hurt

Builders are running into delays due to a shortage of ship plates. On turbines and major propulsion systems, manufacturers are booked two years ahead. Marine boilers are not unusually tight, but deliveries are lengthening. Boiler makers have a problem getting enough steel. They doubt that a defense rating would do much more than speed up delivery of their usual allocations.

Steel men argue that controls would hurt many industries.

BUSINESS

FARM EQUIPMENT: Just Beginning To Fight

Makers of farm implements are fighting back . . . Industry leaders are diversifying, planning new products, looking at export . . . Some are eliminating unprofitable lines . . . Drought hurts—*By K. W. Bennett.*

◆ IS FARM EQUIPMENT throwing in the sponge?

Minneapolis-Moline closed plants at Louisville, Kentucky, and Moline, Illinois. International-Harvester will close its Richmond, Indiana, plant in early 1957. J. I. Case has closed its Anniston, Alabama, plant. In recent years John Deere has closed out operations in Yakima, Washington, and Syracuse, New York.

And despite optimistic reports in recent months regarding the current sales increase, farm equipment men are not talking a stronger 1957. Behind the hopeful smiles are grim memories of the 1956 sales curve. Which, as a curve, was a bust.

Overdue Realignment

The real answer seems to be that the industry has finally just begun to fight. The wave of permanent plant shutdowns marks the opening salvo in a campaign that should have been begun years ago, some farm equipment men will admit.

Phase one is centralization. While some farm equipment makers prefer to call the process by other names, the fact is that obsolete and uneconomic plant operations are being shucked off.

More widely hailed is phase two—product diversification. Minneapolis-Moline is already going forfard with plans for producing construction equipment, plans to follow with a division selling irrigation systems. Massey-Harris-Ferguson entered the construction equipment field with a bang this summer, has already set up a completely independent distributor-sales force to handle this full-fledged new division.

Both International-Harvester and Allis-Chalmers, long diversified, have indicated that other products carried the profit load in the tough selling year of 1956. John Deere, with new product engineering teams working, points at the multiple purpose combine (used with both corn and wheat and other grains) as an example of growing product diversification within the original farm field. The company's nitrogen fertilizer plant is somewhat further afield, and Oliver's outboard motor division even further. J. I. Case, merging with American Tractor, will enter construction equipment. Everyone of these firms sells tractors in the industrial market, is boosting their sales activity in that area.

Phase three is less well known but counters any theory that farm equipment firms are shrinking. John Deere has acquired Heinrich Lanz, German farm equipment firm, which will put John Deere plants squarely in the center of what the company believes is an expanding European appetite for American mechanized farm equipment.

Minneapolis-Moline has been expanding foreign sales through a semi-licensing arrangement, makes tractor parts in the United States for assembly abroad and has, for example, a major operation in Turkey. Massey-Harris-Ferguson, always strong in foreign operations, has four U. S. plants and 12 abroad, and has been increasing its foreign holdings.

Phase four is an unprecedented drive to redesign existing farm machinery for higher output and

Farm Equipment Work Force Drops

NEED of more mechanized farm equipment may revive manufacturers.

Average annual workforce, agricultural machinery & tractors

1947	140,000
1948	153,000
1949	146,200
1950	139,500
1951	153,600
1952	137,000
1953	126,200
1954	104,800
1955	113,300
1956	110,000

(First seven months)

Bureau of Labor Statistics

greater ease in operation. John McCaffrey of International-Harvester fathered the phrase "controlled obsolescence" three years age for the process. The payoff has come slowly, but is beginning to be generally felt. At a recent equipment demonstration, John Deere drew 120,000 farmers in two days of showings. With the average American farm 240 acres in size and growing, with single family farmers working 400-500 acres, demand for high speed equipment gives new models more sales appeal than a '57 Cadillac in a used car lot.

Nobody sees a rainbow just ahead. Mr. McCaffrey told THE IRON AGE: "The effect of the drought hasn't been fully appreciated. Unless we have weather relief, selling will continue to be difficult in 1957. I now believe farm equipment sales levels will probably only slightly exceed the 1956 level." Senior vice president Henry S. Reddig of Minneapolis-Moline feels the same way. Off-the-record, officials of several more major agricultural equipment firms echo the sentiment. William Hewitt, John Deere president, expects a 10 pct sales increase in 1957. Deere, however, was offsetting the effects of a strike. Disregarding the probable loss of business due to the strike, Deere income was off $30,000,000 in 1956.

Suppliers Hopeful

The immediate outlook for suppliers to the industry is better than the forecasts suggest. Farm equipment manufacturers are increasing their raw material and components intake. Strong buying will not hit until December when most firms will be back in operation. Monthly steel intake is already rising. Through first half the figure averaged 116,000 tons per month, a figure exceeding the 1955 average of 111,000 tons per month. Heavy buying in the early spring fell off as expected spring sales of finished goods failed to appear. Inventories have been pretty well trimmed back. In second half 1956, monthly average steel intake fell below 85,000 tons.

PRODUCTION

RESEARCH: Blast Furnace Facelift

High top pressure operation, combining steam-oxygen in blast and use of preheated blast are projects now under study . . . Aim is 20 pct increase in pig iron.

◆ A REWORKED conventional blast furnace that will combine high top pressure operation, a combination of steam and oxygen in the blast, as well as a preheated blast, seems to be in the books for the Chicago district some time next year. The site: Inland Steel's Indiana Harbor Works. A mininum 20 pct increase in pig iron output from an existing blast furnace is the conservative target.

At a crowded American Iron and Steel Institute session, Inland Steel blast furnace men Charles Squarcy and Richard Wilson reported company studies on six methods of boosting blast furnace output. Weirton Steel's J. H. Strassburger lifted the curtain in May of this year when he reported on blast furnace operation with steam-and-oxygen in the blast. High top pressure operation is already in operation or under test on 28 U. S. blast furnaces.

In Combination

While Mr. Squarcy made no mention of Inland Plans in his paper, it is understood that the Inland furnace would combine the above with ore beneficiation through sizing and agglomeration; along with coal blending and coal washing to produce a stronger coke.

A major outlay will be the $1,000,000 cost of adapting the furnace to high top pressure operation. Experiments thus far have produced the equivalent of an additional blast furnace in the increased output of Inland's eight furnaces in the 1947-1956 period. Daily average production rose from 7350 in 1947 to 8600 net tons early this year and is reportedly still going up. Considerable credit is given to careful blending of coking coals, washing of the coal, and increasing the percentage of sinter and sized ore in the burden. Lion's share of the output gain was due to these physical improvements. Inland research men believe about 1 pct of the gain is due to chemical improvements such as lower ash coke and lower slag ore.

Two large furnaces, of 25 ft 9 in. hearth diameter, scored a 23.2 pct gain in output with a 16.1 pct increase in wind rate, while slag volume decreased 11.4 pct.

Sinter Benefits

With use of sintered ore, Inland metallurgists found that increasing sinter from 0-40 pct could decrease coke consumption by 9-18 pct and improve production by 7-20 pct. On the larger furnaces tested with a 16.1 pct charge of sized and sintered ore an average production per day of 1100 net tons was achieved in 1948. By 1955 the percentage of sintered and sized ore had risen to 30.4 pct while output increased to 1355 net tons per day on the same furnaces. Sinter proved most beneficial where the ore charged is fine and the coke weak. As coke strength goes up and ore is coarser, the benefits of charging sinter begin to fall off.

Blast temperatures of 1500°F were the maximum used during the tests. While most American blast furnaces operate at a 900-1100°F blast temperature, an average 1200-1400°F blast cut coke rate by as much as 10 pct. Preliminary indications suggest that Inland will begin the steam-oxygen enrichment of the blast with a 30 pct oxygen-enriched air mixture and 8 pct steam.

MANAGEMENT

AIR CONTROL: Effective But Expensive

Pittsburgh reports total smoke-improvement of over 88 pct since 1946 . . . Cost industry $250 million . . . Total nationwide expenditure this year will top $240 million—By G. J. *McManus*.

◆ JUST BEFORE the start of Cleaner Air Week (Oct. 21-27), office workers were sunning themselves in Pittsburgh's Mellon Square.

There is no longer anything unusual about this. Today in Pittsburgh, stagnant air means little more than an early morning haze. It is nothing like the lingering smog that was a regular part of the city's existence prior to smoke control.

Since 1946, the city has reduced heavy smoke by 96.6 pct; total smoke by 88.8 pct. In this period local industry has poured over $250 million into smoke control equipment. Home, utility and railroad burners have gotten close attention from city and country smoke officials.

Spending Up

Pittsburgh's cleanup is one of the most dramatic but it is far from the only smoke control program in the nation. Over 100 cities now have smoke ordinances. There is a Federal smoke law and three state laws on the books.

Nationwide expenditures for smoke control in 1956 will run about $240 million. This is 20 pct over last year and does not include government and civic research.

For the individual company, the cost of smoke control can be expensive. Jones & Laughlin Steel Corp. is currently spending $2 million in Pittsburgh alone to eliminate air pollution. More than 21 carloads of equipment from Fly Ash Arrestor Corp. have gone into Reserve Mining's taconite installation. Dravo Corp. has installed $140,000 worth of fly ash collector equipment at Superior Steel. Koppers Co. put 18 electrostatic precipitators on the openhearths at U. S. Steel's Fairless Works.

Cost of a large precipitator is about $200,000. A rough rule is $1.00 to $1.50 for every cubic foot of gas to be cleaned a minute.

Problems

On new construction, shops can be designed for use of collector equipment. Older furnaces present a tougher problem. In an openhearth, for example, gas must be cooled from 1200°F down to under 600°F before it goes to a precipitator. This calls for special ductwork and cooling chambers.

On electric furnaces there is the added difficulty that the furnace roof and the furnace itself may tilt. This mobility makes efficient gas collection almost impossible without a complicated rig.

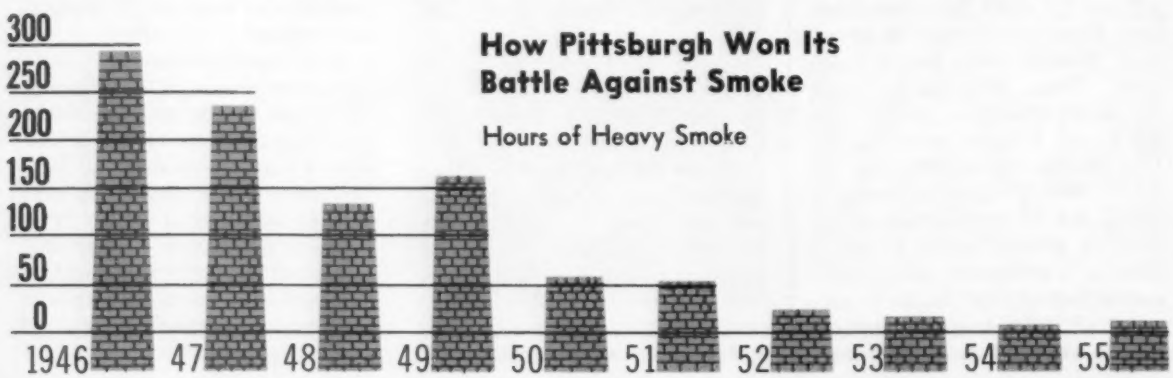
Pittsburgh **BEFORE**

And finally the positive pressure created by oxygen injection works against the negative pressures of exhaust ducts.

Best answer to these problems appears to be the new electric furnace collector system at McLouth Steel.

But applying any known technique of collection to existing steel furnaces still takes a prohibitive sum of money. Pittsburgh City smoke control men concede this and have given the mills until 1959 to come up with a practical method.

Another big problem in smoke control is what to do with collected dust and smoke. At Su-



perior Steel, the steam boiler collector turns out 10 to 15 tons of flyash a day. A single power plant produces 80 truckloads of ash daily. Cost of disposing of this is estimated at $1 a ton. As a result, utilities and others are pushing flyash as a mixing material for cements.

Still another headache is the question of standards. The Pitts-

Pittsburgh **AFTER**

burgh code, which is in line with most others, says smoke shall have a visual density of no more than No. 2 on a Ringleman chart.

Pittsburgh limits physical density of fly ash to 0.30 grains per cubic foot of flue gas at 500° F.

Disagreement

These standards leave a lot to be desired according to smoke people, but there is still a lack of certain information on which to base new yardsticks. Doctors still disagree as to the exact cause of the 4000 deaths that resulted from the 1952 London fog. It is generally agreed that most smoke damage is in the form of respiratory irritation but there is uncertainty about critical concentrations.

Work is now progressing which is expected to provide more definite and concrete information.

There is a growing feeling that industry may be taking it on the chin for pollution due to other sources. In Los Angeles during the past year, there were about 2200 violations of the smoke code. Nearly half of the court cases filed involved auto exhaust; only 111 dealt with plants.

GOVERNMENT

NICKEL: Stockpiling May End

Govt. will halt reserve buying by year's end if private industry provides planned new capacity . . . Steel mills not too hopeful move will add to their supply.

◆ THE GOVERNMENT plans to end its purchases of nickel for stockpiling by Dec. 31 if private industry provides the new capacity. However, steel producers are not too optimistic about the prospects of getting more nickel for their uses.

The Office of Defense Mobilization has already dropped all calls for nickel in the first quarter of next year, and diverted a total of 25 million lb originally scheduled for delivery to the stockpile in the final three months of this year.

ODM says if the government signs contracts with firms now negotiating under the nickel capacity expansion program, there will be no further need to add to the government's nickel hoard. The nickel expansion program provides tax amortization and guaranteed purchases at premium prices for firms willing to build new nickel production facilities. The goal calls for production capacity of 440 million lb a year to be available to this country to meet the needs of a future war. At present, only about 300 million lb a year is available here.

Users Skeptical

Some months ago, Arthur S. Flemming, ODM chief, stated flatly that there could be no end to nickel stockpiling under conditions then existing. However, reaction to the new premium price offer changed the picture, he says now.

However, steel producers indicate they'll welcome additional quantities of nickel but will believe they are getting more when they see it.

Skepticism arises from past promises that came to nothing with nickel diverted from the stockpile but military requirements for the metal increasing. In June of this year, the military bite was the biggest in history and July was even bigger. New effect of military and ODM fluctuations is that producers have been getting the same amount or less nickel. This situation would not necessarily change if ODM completely stopped its stockpile calls in the first quarter of 1957.

One steel producer estimates that 40 to 45 pct of the available nickel supply is now going to the military. Industry estimates are that a 10 million lb diversion for second half of this year has meant that no nickel was going into stockpile. This estimate does not take into account any increase in nickel producing capacity during 1956.

U. S. Steel will put into operation early next year a new 48-in. sendzimir mill at Vandergrift, Pa., and facilities that will give a 50 pct increase in cold rolled sheet and strip facilities at Gary. Right now, the Corporation could probably not increase stainless sheet production even with more nickel. But the new facilities will call for more nickel.

A spokesman for Allegheny Ludlum Steel Corp. states the company is unable to evaluate the ODM move in terms of the amount of nickel which can be released. Reason is lack of information of the exact quantities of nickel which have been stockpiled.

However, Allegheny Ludlum approved of the governmental decision on concluding nickel stockpiling and felt it would aid the company's business appreciably. At present a considerable number of unrated orders for chrome nickel stainless are being turned away.

BATTERIES: Competition Spurs Research

Number of battery producers have increased 25 pct in a decade, but demand is relatively stable . . . Units are getting smaller, lighter and more durable . . . Automotive uses 80 pct of total . . . Guarantees extended.

◆ LOOK THROUGH one of the new transparent plastic battery containers that are appearing on the market and you realize that the storage battery industry is doing a lot toward improving its products' sales appeal.

The transparent containers give the batteries not only an attractive appearance, but they cut down on weight and allow electrolyte level to be checked in the cells without removing the caps.

Behind this and other improvements is a hard fact: battery manufacturing is highly competitive. An influx of 62 new firms into the field in the past decade has increased competition in a relatively stable demand situation. There were 308 companies in 1954 compared to 246 in 1947.

Shipments Higher

In 1947, value of shipments by the industry was $297.7 million, according to the U. S. Census of Manufactures. By 1954, the figure increased to $341.4 million—a rise of 15 pct. Estimates for 1956 based on first half statistics show that automotive battery shipments will be 3.8 pct higher than in 1954; and industrial battery shipments will be roughly 25 pct higher. Automotive batteries account for about 80 pct of the industry's total. Dollar value of shipments will approximate $352 million.

Like many industries, improved production methods between 1947 and 1954 enabled the storage battery industry to decrease the number of employees from 16,600 to 15,700—a drop of 5 pct.

Other Improvements

Some of the other major improvements in battery design since 1947 include better grid alloys, reduction in specific gravity of electrolyte, revival of "dry charging," and development of the sealed cell in nickel-cadmium type batteries.

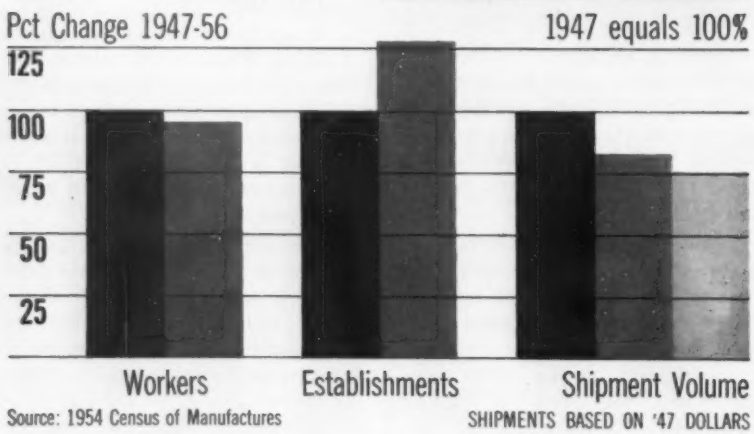
By improving grid alloys in lead-acid type through use of arsenic and silver, and decreasing the proportion of antimony, some companies are turning out batteries that can take more abuse and neglect. Lead-acid type batteries are almost universally used in automobiles.

Another major improvement in the automotive battery is reduction of electrolyte specific gravity. Prior to 1936, the specific gravity was 1.280 to 1.300. But today, improved electrolytic solutions retain conductivity at 1.24 to 1.26; allows batteries to withstand higher temperatures—an important factor with the under-the-hood location of batteries in most cars today.

These advances have resulted in upping life guarantees of best line batteries to four years by most manufacturers. Previously, guarantees rarely exceeded two years.

The newest thing in alkaline type nickel-cadium batteries is the "sealed cell." It has advantages of never requiring addition of water and no danger of spilling.

Checking The Battery Industry



Source: 1954 Census of Manufactures

SHIPMENTS BASED ON '47 DOLLARS

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The Iron Age, Chestnut & 56th Sts., Philadelphia 39, Pa.

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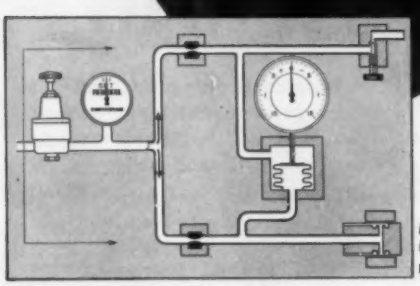

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EXPANSION IN INDUSTRY

Rectifiers:

Aluminum industry is a $60 million market.

The rapid, king-size expansion plans of the primary aluminum producers are creating a correspondingly increased market for rectifier equipment. The biggest producers of this equipment, General Electric and Westinghouse report a total of $60 million worth of orders.

General Electric will collect $35 million from four different companies for its pumpless rectifiers.

Aluminum Co. of America has placed an order for seven systems to be used at its plants at Rockdale, Tex., and Evansville, Ind. Reynolds Metals wants to buy pumpless rectifiers for three potlines at its Listerhill, Ala., plant. Kaiser Aluminum and Chemical will install 2 GE units at its plant at Ravenswood, W. Va., and one at Chalmette, La. And Olin-Mathieson Chemical has ordered package-type pumpless rectifier substations to serve three potlines at Clarington, O.

Westinghouse will sell $4 million worth of rectifier equipment to Kaiser and about $21 million to the rest of the aluminum industry.

Advantages cited for installation of pumpless units to power aluminum potlines includes lower installation and maintenance costs, and the fact that they occupy less space.

Producing Prototype

Strategic-Udy Metallurgical and Chemical Processes, Ltd., a subsidiary of Strategic Materials Corp. will put a protoype, low cost electric furnace in operation sometime in November at Niagara Falls, Canada.

Its intial task will be to process some 5000 tons of low grade manganese from the company's New Brunswick deposits. Operation will be aimed at providing engineering design and cost data which will be utilized in construction of a planned commercial plant of the same type. Bigger plant is expected to be able to produce 75,000 tons of ferromanganese annually.

More Tube

Republic Steel Corp. will spend about $3 million to expand both space and equipment at its steel and tubes div., Ferndale, Mich.

Project is aimed at increased production of Electrunite, light wall conduit tubing.

One new building will be constructed, shipping facilities will be enlarged. New equipment will include high speed welding machines, finishing equipment, and electrogalvanizing equipment.

Navy Supplier

Lukens Steel Co., Coatesville, Pa., has been named recipient of a Navy contract for $1.7 million worth of steel armor plate required by the Bureau of Ships, Navy Department.

Sen. Duff., (R., Pa.) disclosed the award of the new contract to Lukens. The Navy, while saying that the order will be let, has asserted that the contract is still in process of negotiation.

Double Header

Diamond Alkali Co., Cleveland, O., will expand current facilities at Deer Park plant, near Houston, Tex., and construct a new facility.

Expansion project will be aimed at increasing production of chlorine, caustic soda and hydrogen by 40 pct.

New plant will be devoted to the manufacture of acetylene. It is expected that production will commence late in 1957.

Additional facilities should be completed first half of 1958.

Expansion Briefs

Westinghouse Electric Corp., Pittsburgh; received an order for $4 million worth of electrical equipment for Tata Iron & Steel Co. mills, Jamshedpur, India.

Federal Steel Corp., Dayton, O.; constructed new quarters, ready for occupancy January 1957.

Ozalid Div., General Aniline & Film Corp., New York; plan new machine production plant to be constructed at Vestal, N. Y.

Edgcomb Steel Co., York, Pa.; 28,000 sq ft addition to its warehouse.

De Laval Steam Turbine Co., Trenton, N. J.; 5400 sq ft of additional foundry space, new cobalt 60 radiography room for casting inspection.

Kawneer Co., Niles, Mich.; adding facilities to Cynthiana, Ky., plant to produce broader line of decorative aluminum parts.

Dravo Corp., Pittsburgh; landed a contract for two Dravo-DeLaval mill lubrication systems from Mesta Machine Co., Pittsburgh.

Charles Bruning Co., Inc., Chicago; reproduction machine manufacturer; will build new manufacturing plant and office in Mt. Prospect, Ill.; cost about $3 million.

Pemco Corp., Baltimore, Md.; will construct new building for research and development laboratories; triple present space.

The Kendall Co., Chicago; constructing new plant at Franklin, Ky., for production of industrial tape and plastic specialties; cost about $1.3 million.

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BUILDERS OF PRECISION MACHINE TOOLS, SPECIAL AND PRODUCTION MACHINERY SINCE 1916

Extra Rugged...

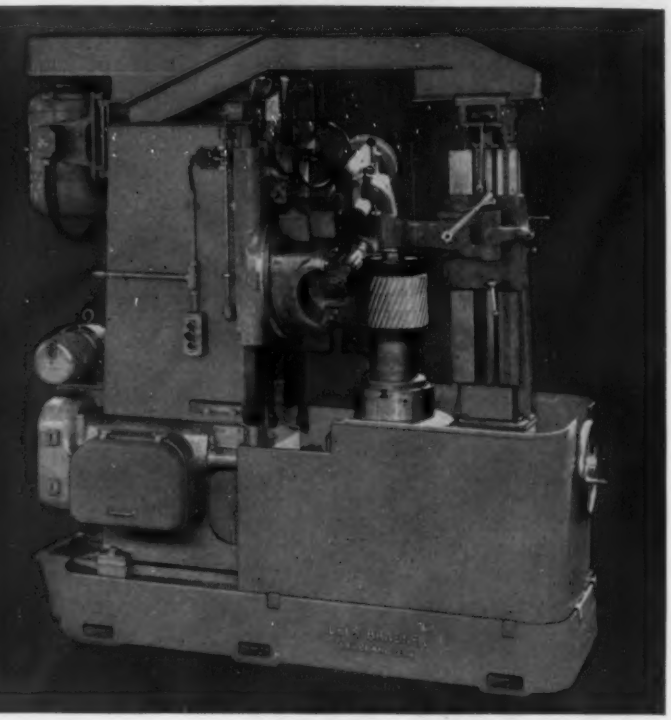
For The ROUGH Hobbing Jobs!

THE BIG

LEES-BRADNER

R

HEAVY-DUTY GEAR HOBBING MACHINE



Built rugged and reliable to handle those rough, tough gear hobbing jobs . . . that's the new Lees-Bradner Model "R".

It's designed to hob spur or helical gears up to 1¼ DP with a left or right hand maximum helix of 45°.

The Model "R" features fast loading and unloading, ready access to index and feed change plus easy operation and maintenance.

Write for your free brochure giving the detailed capacities and specifications of this new heavy-weight hobbing machine.

SPECIFICATIONS

Maximum outside diameter	
with tailstock column	16"
without tailstock column	18"
Minimum C/D hob to work	1½"
Maximum C/D hob to work	12"
Travel	18"
Maximum diameter of hob (3-1, 6-1, or 12-1 backgearing)	10" x 10"
DP range	1¼ DP to 16 DP
Maximum manual (or electric) shift of hob	6"
Diameter of hole through work spindle	2"
Machine weight	13,000 lbs.

the LEES-BRADNER *Company*

CLEVELAND 32, OHIO • U.S.A.

Roebling drum packs are shipped on pallets unless otherwise specified. This gives you today's easiest, least expensive method of moving and stacking wire — with a fork truck, one man can do the work of ten.

Packed to save you money!

IN ADDITION to producing top quality high carbon wire, Roebling has developed many special methods of packing ... and some *one* of these, or some other method which may be developed for your specific requirements, may save a considerable amount of time and money in your plant.

Certain types of wire, for instance, can be packed in hexagonal fibre drum packs that provide superior protection and facilitate handling and storing wire. Drum packs do not have to be returned ... save you bother, storage space and freight charges.

You *pay* for the best when you buy high carbon wire. Make sure you *get* the best, in wire and packing too. Always specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2340 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK

If you wish, Roebling spools will be delivered on pallets with separators, providing the easiest and most economical means of handling and stacking wire with fork trucks.

How to GET THE JOB DONE at low, low cost!

benchmaster

world standard in small presses

Manufacturers all over the world have found Benchmaster Punch Presses the answer to *high production with minimum investment!* With their *compactness requiring little floor area, fast crankshaft speeds* and *high number of strokes per minute,* any Benchmaster will tremendously outproduce big presses on work where high tonnage is not necessary.

If your job is *beyond* the tonnage capacity of a single Benchmaster, investigate our Multiple Ram Presses ... 2 or more Benchmasters operating in tandem off a single crankshaft. You get *more bed area, progressive die operation* with *individual die stations, lower die cost* and *easier die maintenance*... at savings up to 50% in press cost!

DON'T OVERLOOK THE POSSIBILITY OF A SPECIAL BENCHMASTER designed to accommodate your specific job. Ask for our recommendations!

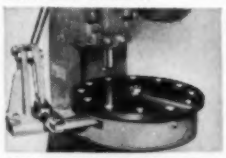
BENCHMASTER ACCESSORIES

Built by *press experts* for *production experts!*

These accessories make press operations more automatic, eliminate unnecessary cost and get more work out per shift! You'll find them a big advantage on all Benchmasters and other presses, large or small!

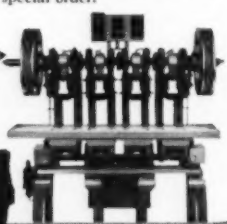
KOIL KRADLE AND ROLL STRAIGHTENER COMBINATION—Straighteners also available as single units. Feed rate variable 25 to 100 rpm, straightener thickness capacity .200". Other sizes available.

KOIL KRADLES—Supplies a slack loop from which any machine can draw. Takes the drag off automatic feeding devices, increases feeding accuracy on progressive or multiple die operations; puts through more footage per hour. Many sizes: 1200 to 4000 lbs., 36" to 60" coil diameters, 10" to 28" widths. Larger capacities available.



ROTARY INDEX FEEDS—Converts your presses for automatically marking, crimping, assembling, reaming, trimming, etc., at speeds up to 6000 strokes per hour. Easy installation—4 bolt mounting. Two sizes: 12" or 15" tables, 10 or 12 stations. Larger sizes on special order.

AUTOMATIC FRICTION ROLL FEEDS—Lowest price on the market! Ideal for production work feeding small coil or strip stock. 3", 5", 7" and 9" roller widths. Two models, feeds adjustable from 0 to 3" cutoff or 0 to 6" cutoff. Plain, knurled or rubber covered rollers. Fits Benchmasters and other presses.



When you need a *SMALL MILL* remember Benchmaster. One mill handles both horizontal and vertical milling jobs. Takes an astonishing bite, yet holds close, precision tolerances.

CHECK YOUR BIG PRESS PRODUCTION AGAINST THESE OUTPUTS

. . Then choose a Benchmaster for more parts per hour!

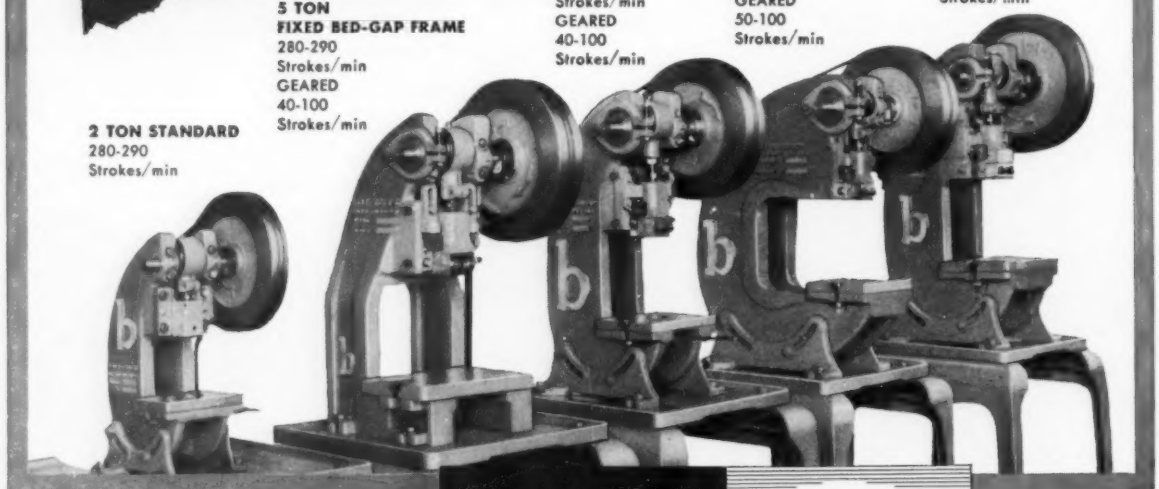
2 TON STANDARD
280-290
Strokes/min

5 TON FIXED BED-GAP FRAME
280-290
Strokes/min
GEARED
40-100
Strokes/min

5 TON STANDARD
280-290
Strokes/min
GEARED
40-100
Strokes/min

5 TON DEEP THROAT
280-290
Strokes/min
GEARED
50-100
Strokes/min

8 TON STANDARD
180-190
Strokes/min
GEARED
40-100
Strokes/min



FREE CATALOG—Shows complete line of Benchmaster *money-saving equipment* for stamping and metal working industries. Write for free copy or ask your Benchmaster dealer!

benchmaster

World's largest manufacturer of small punch presses and mills.

1835 West Rosecrans
Gardena, California

REPORT TO MANAGEMENT

It's Going Higher and Higher

Even if you are only a casual reader of government statistics, you probably caught the cheering news that the Federal Reserve Board's index of industrial production is back at record levels.

For the record, September's rate (adjusted) hit 144 pct of the 1947-49 average. This is equal to the record set in December, 1955.

But that only begins to tell the story. While September was an exceptionally good month by all standards, there are sure signs that the index will climb higher in October, perhaps even higher in the months ahead.

For one thing, auto production was down in September, as a result of model changeovers. Biggest reason for the September surge was the continued strong steel output, plus higher iron ore activity than is the rule in September.

With auto plants calling back literally thousands of workers, October's industrial activity should continue to climb through November.

The new record doesn't really represent a sudden resurgence of industrial activity. With the exception of the steel strike period, the index has been remarkably stable at a high level all year. With that exception, the index has varied from 141 to 145 most of the year.

An Assist from the Capitals

In evaluating the effects of government spending, tendency is to confine attention to federal spending. But a look at state expenditures for new facilities can be eye opening.

Total public construction, for example, is booming along at better than a $13 billion annual rate. Although private construction is well over $30 billion, public building represents a significant investment.

But by far the bulk of public construction is state and locally owned—$6,816,000,000 in the first eight months of this year compared with $1,693,000,000 federally owned.

Educational buildings and highways take up the lion's share of this figure, but sewer and water projects are gaining in importance.

Public sewerage systems alone will require capital investment of $14.1 billion to increase facilities and $8 billion for replacement of obsolete facilities in the next 20 years, according to a Dept. of Commerce projection.

About Those Freight Cars—

The shortage of freight cars is going to get worse before it gets better. Steel shipments will pick up, if that is possible, and shipments of parts to the auto industry will demand more cars, just to name a couple of examples. And, something that couldn't have been anticipated, gondola cars are now being diverted to direct shipment of ore by rail.

The figures show that car loadings are about 145,500 cars a week, about 10,500 better than a year ago. But deliveries of new cars aren't coming up to expectations and scrappage of obsolete cars is eating up much of the added rolling stock.

Orders for new cars totaled 3949 in September, but the backlog of undelivered cars is now at 122,421. Deliveries of new freight cars decreased in September, down to 3444 from 5364 in August, probably due in a large part to shortages of plate and light structurals.

INDUSTRIAL BRIEFS

Continental Capital . . . Two plants valued at $400,000 have been added to the overseas manufacturing and assembly facilities of wholly owned subsidiaries of Walter Kidde & Co., Inc., Belleville, N. J. The first, at Northolt, Eng., manufactures carbon dioxide industrial and marine fire detecting and extinguishing systems while the other plant located near Hamburg, Germany, will assemble marine carbon dioxide and smoke detecting systems and Kidde rachel knitting machines.

Yankee Ingenuity . . . Steam-degassing of steel is now being done successfully by a completely American process—using equipment designed and built in this country by F. J. Stokes Corp., Philadelphia.

Pittsburgh Story . . . Allegheny Ludlum Steel Corp. was awarded the bronze "Oscar of Industry" for having the best annual report of the steel industry, for the second year, by Financial World, a publication.

New Twist for Nails . . . Jones & Laughlin Steel Corp. now has U. S. manufacturing rights for a spiral nail. As expected: Better holding power, less splitting, easier driving. Most unexpected: Cost 5 pct under standard nails.

Casting New Play . . . Red Seal Metals Co., South Gate, Calif., producers of 2424-C, cast aluminum tools and jig plate, has appointed Peter A. Frasse & Co., Inc., New York to distribute its products in the Eastern United States.

Filter Tip . . . The Yale & Towne Mfg. Co. has introduced an improved, dust protected, gasoline powered industrial lift truck for materials handling in locations containing atmospheric abrasives.

No Ghost Writer . . . Howard C. Ludwig, of the Metallurgy Dept., Westinghouse Research Laboratories, Pittsburgh, was awarded the 1956 James A. Lincoln Gold Medal, presented annually for the best single-authored paper by the American Welding Society.

Companies Alloy . . . Townsend Co. has purchased controlling interest in newly-organized Impact Products, Inc., Orangeville, O., after a successful joint experimental project in the technique of cold forming super alloy metals.

Annual Award . . . Gregory Industries, Inc., will present an annual $1500 cash award to "the person responsible for the development of stud welding applications or studs which shall be judged on the basis of: Reducing costs for industry, improving the appearance, serviceability and life of a product or structure, or performing a function not possible by any other method."

Atomic Control . . . The Westinghouse Electric Corp.'s Switchgear Div., located at the company's East Pittsburgh works, has been assigned responsibility for the control and instrumentation of nuclear reactor plants for the generation of electrical power and for propulsion purposes.

For Distinguished Service . . . Metal stamping industry's Presteel Award for 1956 has been presented to Stanley R. Cope, president of the Acme School of Die Design Engineering, South Bend, Ind. Selection was based on Mr. Cope's expert training of 2500 die design students and his research projects which have resulted in improved stamping procedures. Award was established in 1954 by Worcester Pressed Steel Co. in conjunction with the Pressed Metal Institute.

Pays To Be a Cut Up . . . A $37,600 contract was awarded to Battelle Memorial Institute for the evaluation of the present knowledge of metal cutting. The ASTE Cutting Research Project was set up to determine if a better understanding of the metal cutting process can be developed. Work will be carried on under the direction of Dr. F. W. Boulger.

Close to Home . . . The Grindle Div. of The C. O. Bartlett & Snow Co., manufacturer of cupolas, cupola charing equipment, melting furnaces, dust, fume and smoke control, and accessory equipment, has moved to the company's main headquarters, 6200 Harvard Ave., Cleveland.

Proof of the scope and versatility of our engineering services moves across our shipping floor daily. There you will see an astounding variety of primary and auxiliary rolling mill equipment, and specially engineered machinery of every description.

But it is not design experience, alone, that makes our engineering outstanding. Equally important are our extensive and varied foundry and machining facilities which give our engineering staff unlimited freedom in designing for production.

We call this perfect coordination of design and production "engineering experience *in action.*" The result is efficient, practical, cost-saving equipment for your plant.

LEFT FOREGROUND — Conveyor table for rod or tube

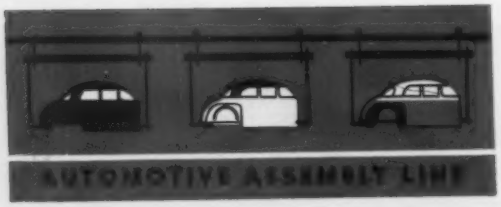
Hot Strip Mill Finishing train designed and built for Detroit Steel Corporation

Pittsburgh ENGINEERING & MACHINE CO.

Division of Pittsburgh Steel Foundry Corporation

P. O. BOX 986, PITTSBURGH 30, PENNSYLVANIA
PLANT AT GLASSPORT, PENNSYLVANIA

"Steel castings including alloys from 1 lb. to 100 tons"



Automakers Lean to Throw-Away Tools

Survey indicates trend to cutting tools that are thrown away and not sharpened . . . Chrysler a big user at its transmission plant . . . New uses are under study . . . Cost and speed are factors—*By T. L. Carry.*

◆ INDICATIONS are that the use of carbide throw-away inserts in automotive cutting operations is growing.

A recent survey conducted for the Wesson Co., maker of carbide tools also shows that within a relatively few short years throw-away insert tools will average 40 pct of all single point operations used in metalworking.

In the transportation equipment field, the auto industry is the leader in the use of throw-aways. If you include railroads, boats, ships, etc., in the field of transportation equipment users, without weighting the figures for size of plant, 1 out of every 5 single point machining operations is presently a throw-away job.

Chrysler a Leader . . . Predictions are that in this field alone, the use of carbide inserts will shortly double.

One of the biggest users of throw-aways in the automotive industry is Chrysler Corp. The tools are being used extensively at the company's Kokomo, Ind., transmission plant for such operations as turning and single point boring.

In addition, Chrysler is presently experimenting with the use of throw-aways for multiple point boring operations in its shops.

It is significant to note why more and more carbide throw-aways are being used today. All of the reasons hinge directly or indirectly on cost of operations.

Reasons Why . . . First of all, the use of throw-aways eliminates the need for sharpening tools. Secondly, tool changes can be made easily and quickly by the machine operator.

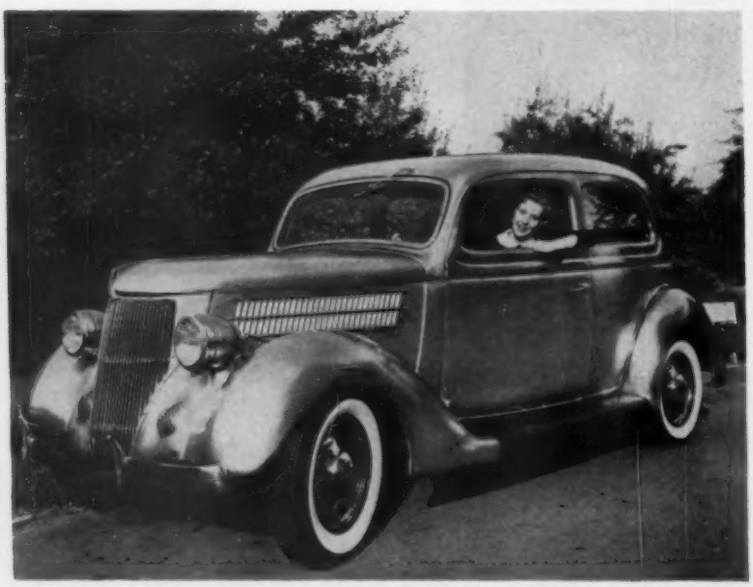
Once the need for sharpening tools is eliminated, it is no longer necessary to maintain extensive facilities to do the job. In addition, tool grinders are hard to find and it is expensive to train them.

Also, throw-away tools don't require elaborate setting up on machines and this is a great economy factor on automated or semi-automated production lines, because it reduces downtime considerably.

More To Come . . . Carbide insert manufacturers believe that they have only scratched the surface as far as the use of throw-aways is concerned. They predict that the time is not far off when industry generally will be using more and more even for complex operations.

Among the projected uses for throw-aways, the most frequently mentioned in addition to turning and milling are boring, planing and shaping. In addition, it is possible that they could even be used on automatic screw machines, turret lathes, form cutters and even broaches.

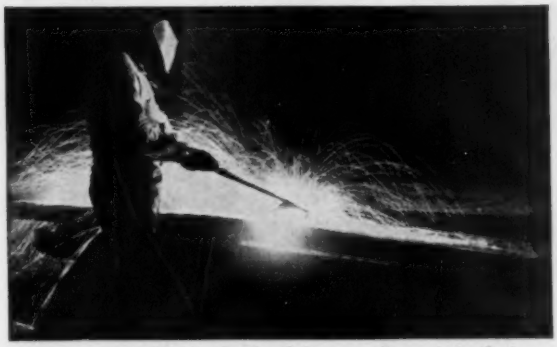
Ray W. Ruckel, Wesson Co.



THIS 1936 FORD is one of six stainless steel bodied cars produced 20 years ago for Allegheny Ludlum Steel Corp. Repurchased from an owner to which it had been sold, the company has been renovating it for the past several months. Working parts needed repair, but the body required only cleaning. It has traveled over 250,000 miles, survived three engines.

How Great Lakes Steel *planes* quality

144 BURNER JETS automatically plane both top and bottom of slabs to remove surface cracks and impurities.



HAND SCARFER double checks slabs to make certain that any flaws extending below surface are also removed.

Just a dramatic picture of a steel mill in action? Far from it! These sizzling-hot sparks tell another very important story about the special care that goes into making steel at Great Lakes.

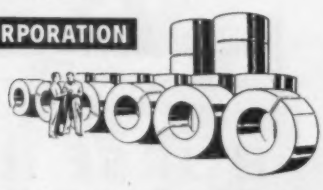
They're bouncing out from beneath the burner jets of the automatic hot scarfing machine. Scarfing? Just as you plane wood to get a smooth, flawless surface, so does the scarfer automatically burn away the top and bottom "skin" from each slab of steel. Then, jets of water sweep the slab clean.

The end result: you get a higher quality, deep-drawing sheet with an inherently flaw-free surface. That's one more important reason why you should call Great Lakes about your steel needs. And remember, Great Lakes customers get what they call for.

GREAT LAKES STEEL CORPORATION

Ecorse, Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION



District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

PRODUCTION SHORT CUTS WITH

ZINC

DIE CASTINGS

NUMBER 5 OF A SERIES

▲ Assembly is a simple job with two mounting brackets and dust shield pre-assembled. The ZINC Die Casting becomes a structural member of the cabinet and supports the front glass and tuning controls.

◀ This ZINC Die Casting, designed by Westinghouse for its 1957 line of TV receivers, requires no secondary operations other than a baked electrostatic spray finish. The name and indicator arrow are cast into the frame.

Framing the picture at WESTINGHOUSE

At WESTINGHOUSE, TV designers recognize that *appearance* and *production cost* are just as important as maximum performance to the success of a new line of receivers. To get the utmost in eye-appeal and production economy in the 1957 models, WESTINGHOUSE combined the outer screen frame and the cabinet front in a beautifully designed, one-piece ZINC Die Casting.

How else could the front panel and screen mask be produced complete with mounting studs accurately cast for quick assembly?

How else could the necessary control openings and parts recesses be provided without expensive machining?

How else could you secure a part having more than adequate structural rigidity at a great saving in cost?

What other metal or process could excel ZINC Die Casting in attaining such a clean, satin-smooth finish?

These basic qualities account for the widespread use of ZINC Die Castings in many fields—uses which result in production short cuts to more durable and handsome products. For possible answers to *your* manufacturing design problems, send for our brochure and contact any commercial die casting company.

◀ **Send for your copy.**

The New Jersey Zinc Company, 160 Front Street, New York 38, N. Y.

ZINC
FOR DIE CASTING ALLOYS

The research was done and the Zamak die casting alloys were developed with

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Oct. 20, 1956	97,685	23,618
Oct. 13, 1956	74,417	22,569
Oct. 22, 1955	142,137	27,059
Oct. 15, 1955	105,528	25,250
To date, 1956	4,478,814	976,297
To date, 1955	6,642,465	1,070,174

*Estimated. Source: *Ward's Reports*

president, is optimistic in his predictions for the future of throwaways in the metalworking field. Mr. Ruckel does not say that they will completely displace well developed and well equipped grinding departments. But he believes their use would greatly decrease the load on such operations.

Smog:

Progress slow in hydrocarbon battle.

The industrywide project to develop an anti-smog device for automobiles continues to make progress although there is still no real answer to the problem.

A special committee to develop a means of controlling automotive exhaust was set up by the Automobile Manufacturers Assn. in late 1953. So far, about $2.5 million has been spent on the job.

Devices have been designed which will control some of the hydrocarbons which are unburned by a car's engine, but the committee is not yet ready to recommend them for use in Los Angeles, where smog is a big problem.

Research has shown that the greatest amount of hydrocarbons does not escape during the deceleration phase of an engine as was previously thought. So the committee has now turned its attention to controlling the engine's exhaust in the hope that the problem can be adequately solved.

When the project was undertaken, engineers were forced to start from scratch. There was no effective way to measure the amount of hydrocarbons which escaped from an engine. In addition, it was not known just where in the fuel burning cycle, the hydrocarbons escaped.

Thus it was necessary, first, to study traffic patterns in the Los Angeles area to try and find out where the hydrocarbons escaped. Secondly, the committee had to find some means of measuring the amount and type of hydrocarbons that were adding to the smog.

It is generally agreed at this point that most of the hydrocarbons escape through the engine exhaust system. The AMA committee is now turning its attention to the problem of developing a means to effectively control these. In addition, the industry has also developed instruments for measuring the amounts of hydrocarbons that are emitted.

Some of the new instruments will soon be attached to a number of cars in the Los Angeles area.

John M. Campbell, administrative director of GM's laboratories and chairman of the AMA committee, says that the industry has no timetable for when it will come up with an answer to the problem.

More New Models

Two more new cars, Dodge and Nash, are being shown this week.

The Dodge features Chrysler's new front and torsion bar suspension and has a new frame. On some models, the division has reduced car height by as much as 5 in. The Lancer hardtop is less than 55 in. high.

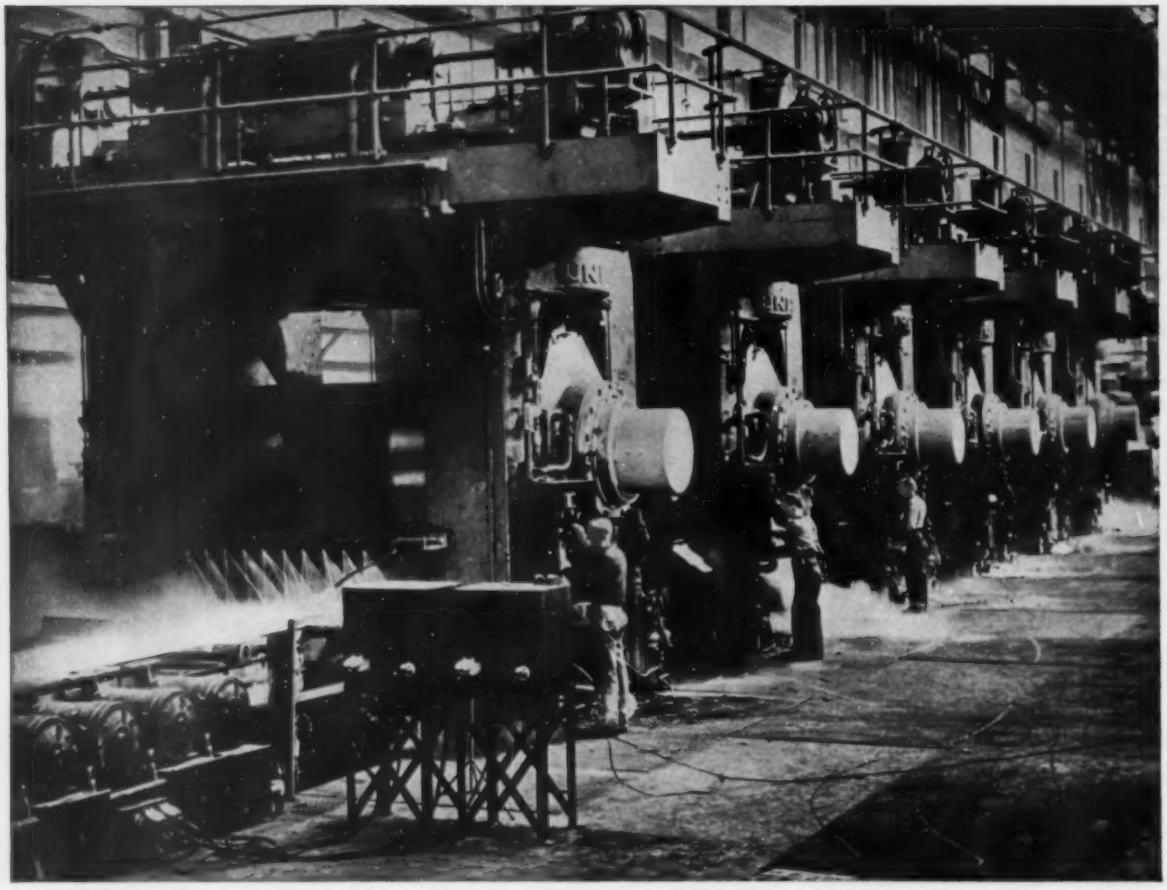
Engine displacement on the V-8 has been increased to 325 cu in. with a compression ratio of 8.5 to 1. A special D-500 engine, which features a redesigned intake manifold and a 4-barrel carburetor, is also available. Compression ratio on the 6-cylinder engine is 8 to 1 and displacement is 230 cu in.

Biggest styling change on the new Nash is the adoption of four headlights. Two lights are mounted vertically in each fender and Nash claims that it is one of the greatest advances in automotive lighting.

All four lights are used on the high beam and the upper two lamps are in use when driving on the low beam. Nash claims that actual night driving tests show that the new system supplies up to 100 ft more illumination while concentrating the light so oncoming drivers will not be blinded.

THE BULL OF THE WOODS — **By J. R. Williams**

TH' BULL OF TH' WOODS GOT THE ORGANIZATION RUNNIN' SO PERFECT NOBODY COMES TO HIM ANY MORE, AN' I BET RIGHT NOW HE'S THINKIN' IT'S GIVIN' TH' FOREMEN TOO MUCH TIME TO LOAF!
THEY'D BETTER LOAF--FOR IF THEY GO ON PERFECTIN' IT THEY'LL SOON HAVE IT SO WE WON'T HAVE ANYTHING TO DO BUT LOAF!
J.R.WILLIAMS
THE EPIDEMIC



Why Texaco Regal Oil protects oil film bearings so much better

Texaco Regal Oil is a specially refined heavy oil—widely used for roll stand circulating systems. It has exceptional oxidation resistance, separates readily from water. That means no sludge. Lines stay clear to carry cooling lubricant unfailingly to your roll necks.

With *Texaco Regal Oil,* bearings get full protection, run at normal temperatures, last longer. Your maintenance costs are bound to be less.

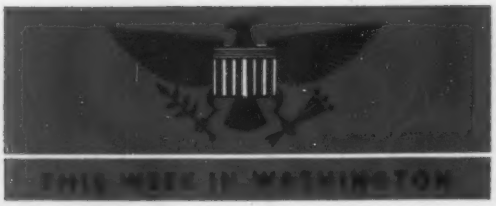
For enclosed reduction gear drives, use *Texaco Meropa Lubricant.* It retains its high EP characteristics through long, severe service. It resists oxidation, thickening and foaming—assures smoother operation and longer gear life.

Let a Texaco Lubrication Engineer show you the way to greater efficiency and lower costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Regal Oils

(HEAVY CIRCULATING OILS)



Reluctant Pentagon Shaves '57 Budget

Political realities force military to ask for modest increase over this year . . . Hike of about $1.5 billion from current $36 billion budget is indicated . . . Will offset higher prices—By *G. H. Baker.*

◆ ADVANCE REPORTS leaking out of the Pentagon concerning the size of the new military budget indicate that only a modest increase—about $1.5 billion—will be involved.

Although there have been rumors that a stiff increase of $8 billion to $10 billion over this year's total $36 billion would be asked, it now appears that no sharp rises of this sort are being seriously considered.

Congressional Cold Shoulder . . . The military chiefs reluctantly put aside their plans for a $44 billion to $46 billion budget for the 12-month period starting July 1 when high-level conferences with political leaders of both parties brought out that Congress would not approve any large-scale increase in military spending.

The most that can be hoped for in these times of "relative peace," the military leaders were told, is to incorporate in the new budget some moderate increases calculated to offset the higher prices of the new and complicated electronic weapons.

Wait and Plan . . . The question put up to the military planners amounted to this: Why insist on an unreasonably high defense budget which Congress will slash to ribbons, when by the exercise of patience and some careful planning you can have a moderately higher budget that will provide for continuance of nearly all existing procurement programs? The military leaders came around to the obvious answer, and the present plan now is to ask for some modest increases in spending money for "automatic" weapons like missiles and rockets and to announce some economy measures like cutbacks in personnel.

The Air Force, for example, may reorganize some of its plane-equipped wings into guided missile wings, thus saving considerably on manpower without any offsetting loss in defense firepower. The manpower cuts won't involve more than 130,000 men—nothing like the rumored cuts of 800,000 men.

News Secrecy a Blind?

Defense Department's growing preoccupation with secrecy in many of its activities has prompted a Congressional committee to take a fresh look at the "need" for the news blackouts imposed by the Army, Navy, and Air Force.

Many congressmen of both political parties—as well as Washington editors—have reason to believe that the Pentagon's demand for secrecy results mainly from a desire to hide incompetence.

A number of high officials appointed by Democratic Administrations as well as the current Administration have declared that as much as 80 pct of papers and matter stamped "secret" has no strategic value except in the minds of Pentagon bureaucrats. Far better, they insist, to remove the secrecy labels from the mass of material and let industry and the public find out what the Pentagon does with the $36 billion it spends.

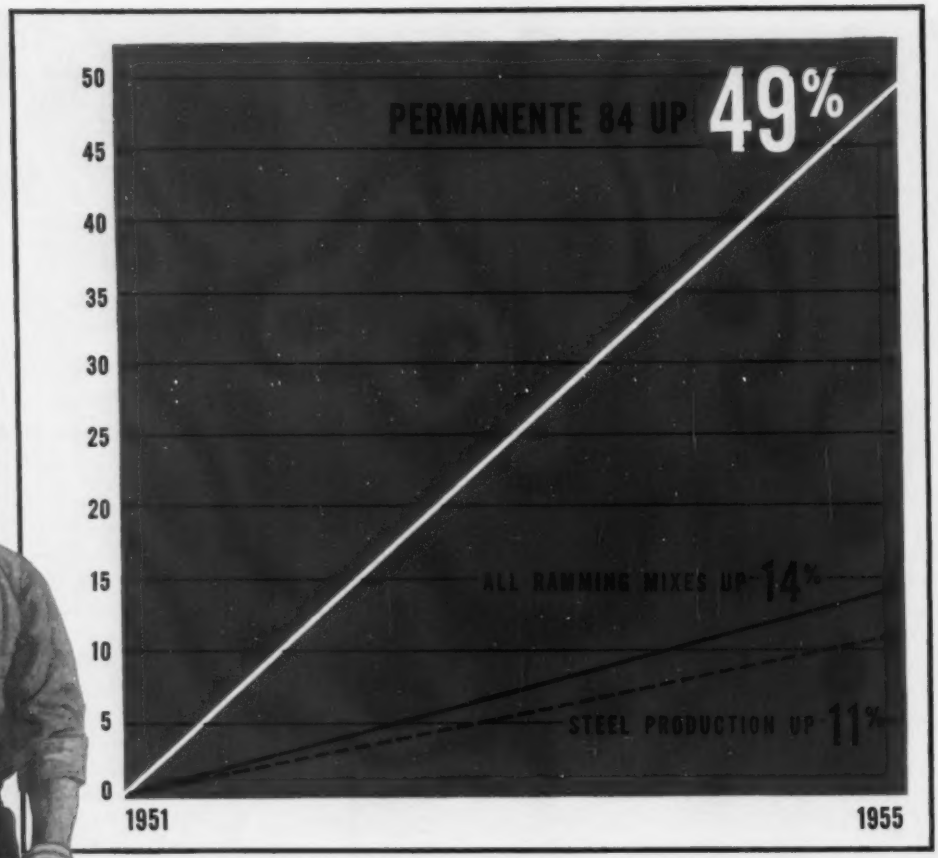
Congressional investigating group is planning to open public hearings on Defense Department policies Nov. 12.

Machine Tool Builders Take Tax-Am Quiz

▪ There's keen interest in a poll—being conducted by the machine tool industry—on whether or not fast write-offs should again be offered machinery manufacturers to encourage production expansion. The results will be watched by mobilizers in charge of government's fast amortization program.

▪ Machine tool builders are being asked:
If government sets a new expansion goal (and offers fast write-off) would you expand your production facilities? How much would you invest in new facilities? What kind and what type of new facilities would you erect? How much extra tool-building capacity would your expansion add?

▪ Answers will be turned over to Office of Defense Mobilization in order to determine if opinions show fast write-offs would stimulate building of defense production facilities. ODM indicates it will make a decision on the subject in January.



Why this growing preference for Permanente 84 Ramming Mix!

As you can see from the chart above, sales of all ramming mixes to steel producers increased only 14% during the five year period ending December 31, 1955.

But during this same period, sales of Permanente 84 Ramming Mix increased *a whopping 49%*!

Why is Permanente 84 increasingly preferred by leading steel producers?

Briefly, here are the reasons:

Permanente 84 reduces the cost of maintaining furnace bottoms and banks. Repairs made with Permanente 84 stay put! Down time for hot-repairs is reduced because repairs made with Permanente 84 last longer. Steel production goes up—costs come down. Ideal for hot patching both open hearths and electric furnace banks and bottoms.

Order Permanente 84 now, and get extra steel tonnage at lower cost.

For more information call our nearest Sales Office: Kaiser Chemicals Division, 1924 Broadway, OAKLAND 12, Calif. . . . 3 Gateway Center, PITTSBURGH 22, Pa. . . . 518 Calumet Bldg., 5231 Hohman Avenue, HAMMOND, Indiana.

To obtain free copies of Kaiser Chemicals product literature write Kaiser Aluminum & Chemical Sales Inc., 1924 Broadway, OAKLAND 12, California, Dept. R6115.

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Seattle Seeks New Industrial Laurels

Area's impressive growth, as reported in new manufacturing census seems only a start . . . Value added to product almost doubled in seven year period . . . Metalworking and aircraft are big factors—By *R. R. Kay.*

◆ SEATTLE'S impressive industrial growth, as reported in the new U. S. Census of Manufactures for the years 1947 to 1954, is apparently only beginning.

Observers there say, "You haven't seen anything yet." And their boast is valid—backed up by what's been going on since the Census takers made their calls.

Transportation Gains . . . There's been a healthy increase in industrial activity, primarily in transportation equipment. Boeing Airplane Co. is the strongest factor in Seattle's industrial outlook.

In 1947 the transportation equipment industry turned out $67 million in value added by manufacture, with 20,000 workers on the payrolls. However, by 1954 value added rocketed 265 pct to $178 million. And 40,000 were drawing paychecks. Right now, the industry employs some 47,000, and Boeing is on the lookout for more workers.

Metalworking Important . . . And what about the metalworking industry? The Census shows that Seattle in 1954 supported 1467 manufacturers, 600 of them in primary metals, fabricated metal products, machinery, electrical equipment, transportation equipment, furniture and fixtures, instruments, and miscellaneous metal products. Today, the city has 1600 plants with a relative increase in metalworking firms.

Between 1947 and 1954 the annual metalworking product grew from $131 million to $288 million. And employment was up from 31,000 to 56,000. Some 2000 more are on the payroll today.

Over-all View . . . As far as the "all industry" picture is concerned there's been an increase from 55,000 workers in 1947 to 80,000 in 1954. But you've got to add another 2000 to be up-to-date. Total payroll: $400 million. And in seven years, value added almost doubled—from one quarter billion to just under a half billion.

State of Washington is doing very well, too. Fourteen of its counties are among the nation's 100 "most important" for buying power in 11 of the top industrial classifications.

Calling All Salesmen

New and expanding plants—located throughout the Farwest — are good prospects for the products of metalworkers.

They include: Safari Trailer Co., Portland, Ore., makers of vacation trailers; Grove Controls, Inc., Emeryville, Calif., valves and regulators; Planett Manufacturing Co., Oakland, Calif., wire products; Excello Tool & Die, Paramount, Calif., tool and die makers; Short Run Stamping Co., El Monte, Calif., metal stampings; A & A Die Casting Co., Gardena, Calif., kitchen and bathroom hardware; Dominion Bridge Co., Ltd., Vancouver, B. C., steel fabricators; Farmhand Company, Portland, Ore., farm machinery; B & H Machine Works, Oakland, Calif., machine shop; Aeromotive Metal Products, Inc., San Jose, Calif., garage doors and hardware; Galvanizers, Inc., Santa Clara, Calif., hot dip galvanizing.

Missilemakers Have Edge For Every Need

◆ BIG AND LITTLE circular cutters are used in machining aluminum honeycomb parts for USAF Northrop SM-62 Snark intercontinental missile. Variation in size runs from three-fourths of an inch in diameter to six inches in diameter. In addition, deviations from the circular-type cutter are used. Employed for making extremely deep cuts they include a cutter which has three V-shaped serrations and another with two chip breakers.

Cutters are ground with a one to two degree bottom concave clearance angle and vary in top clearance from 10 to 30 degrees.

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LAMAR	LOUISVILLE
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DETROIT 26, MICH. 1012 Ford Building Tel.: Woodward 1-9671	GRAND RAPIDS, MICH. 304 Bldg. & Loan Bldg. Tel.: Glendale 8-3647	INDIANAPOLIS 4, IND. Merchants Bk. Bldg. Tel.: Melrose 7-4553	NEWPORT NEWS, VA. Sprague Bldg. Tel.: N. News 6-1331
NEW YORK 4, N. Y. 17 Battery Place Tel.: Bowl'g Gr'n 9-2170	PORTSMOUTH, N. H. Gosling Rd., Box 478 Tel.: Geneva 6-4120	PROVIDENCE, R. I. 1141 Hosp. Trust Bldg. Tel.: Gaspee 1-8500	RICHMOND, VA. Central Nat. Bk. Bldg. Tel.: Richmond 2-9066

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MACHINE TOOL HIGH SPOTS

More Service Blueprinted by Distributors

Better engineering and technical advice for buyers is urged at AMTDA Convention . . . Getting the right type of sales engineer seen as big problem . . . Staging a sales meeting also discussed—By E. J. Egan, Jr.

◆ THE MACHINE tool distributor, long an important link between users and builders, aims to be of even greater service to his customers in the future. Clue comes from the "Better Sales Management" theme which the American Machine Tool Distributors' Assn. adopted for its 32nd Annual Convention at Colorado Springs.

For example, machine tool buyers can expect more and better engineering and technical advice on the essential job of putting new equipment to most efficient use. AMTDA members recognize that customers plagued by the engineering shortage need more of this type of assistance.

The Great Scarcity . . . Prediction that a shortage of industrial production engineers would last at least another 10 years was made by outgoing AMTDA president Henry R. Hanson, of Pittsburgh's and Cleveland's Wm. K. Stamets Co. He said this deficiency must be partially offset by greater reliance upon sales and service engineers of distributor firms.

Even as distributors prepare to carry a heavier customer-assistance load, they also anticipate a steadily growing market for new, more productive machine tools. This means that they're going to have to increase their own sales engineering staffs somehow.

Right Type Wanted . . . Biggest problem they'll have is getting the right type of potential sales engineer. One solution has been proposed, will presumably get earnest attention from Assn. members. It involves gathering suggestions that could lead to a detailed job description of a professional machine tool sales engineer. In turn, this could result in a formal "manpower manual" to guide distributors in hiring new personnel.

After taking this look ahead, conventioneers settled down to consider how they might improve current sales, promotion and advertising efforts. They heard sales-training expert Charles Roth, of Denver's Charles Roth & Associates, declare that the familiar sales meeting is still one of the best and least expensive ways to stimulate more business.

Roth said that good sales meetings (1) give salesmen a "feeling of belonging"; (2) arouse a competitive spirit in sales personnel; (3) force salesmen to set their own objectives and strive to achieve them; (4) develop a professional attitude in the sales force.

Getting Best Combo . . . Roth also listed these essential ingredients for successful sales meetings: a carefully prepared agenda, comfortable accommodations, regular sessions to sustain enthusiasm, short-as-possible meetings (one hour or less), maximum participation by salesmen, liberal use of the well-known sales skit with the added impact of surprise situations.

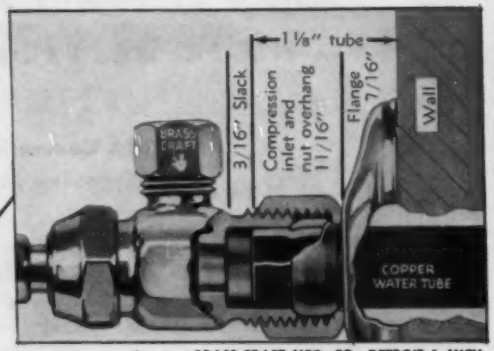
In other convention sessions, distributors learned that action is expected soon on the long-delayed Government turbine-gear program.

JOSEPH F. OWENS, JR., AMTDA's new president is gen mgr, J. F. Owens Machinery Co., Syracuse, N. Y.

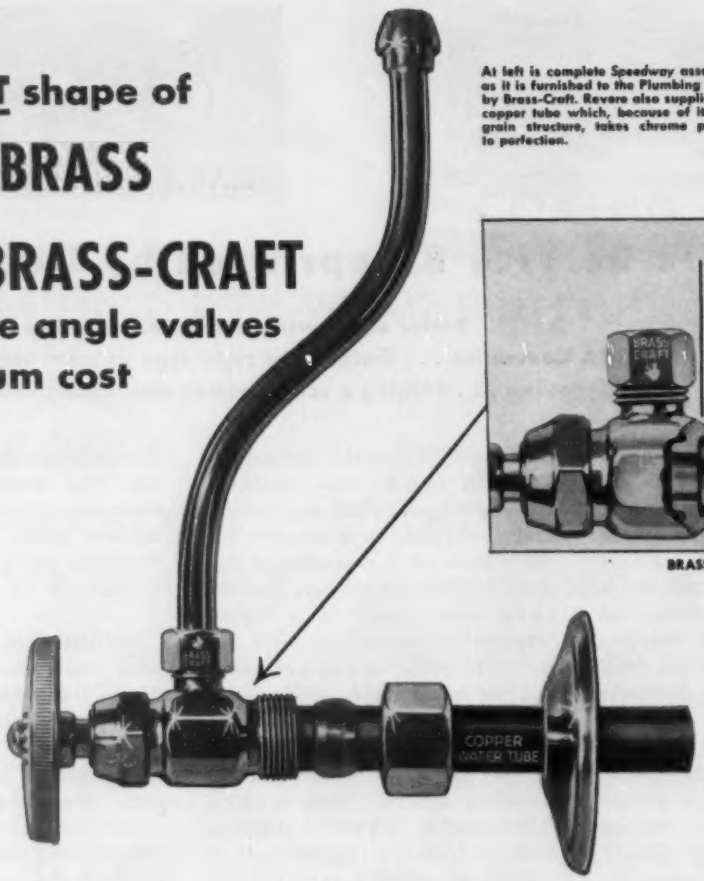
FRANK H. HABICHT, new 1st vice pres of AMTDA, is vp and gen mgr, Marshall & Huschart Machy. Co.

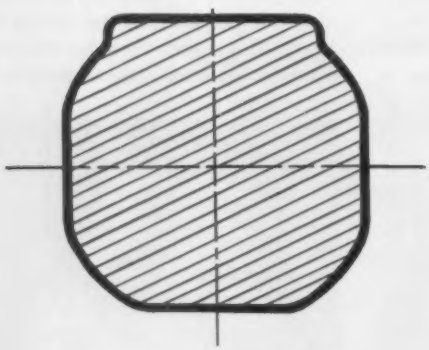
The **RIGHT** shape of
REVERE BRASS
enables BRASS-CRAFT to produce angle valves at minimum cost

At left is complete Speedway assembly as it is furnished to the Plumbing Trade by Brass-Craft. Revere also supplies the copper tube which, because of its fine grain structure, takes chrome plating to perfection.



BRASS-CRAFT MFG. CO., DETROIT 1, MICH.





Cross section of Revere Brass Shape used in fabricating angle valves. Corners are rounded for easy buffing, leaving sufficient surface area for wrench pad. Top is made flat for speedy insertion of outlet.

Brass-Craft Manufacturing Company, manufacturers of Speedway Supplies, Valves & Fittings, considered two factors in selecting the Brass Shape of its angle valves.

1. Fabrication from the standpoint of production.
2. Installation and performance of the valve in use.

The shape at the left was found to be "*right*" from a production standpoint. Brass-Craft preferred it because it was nearest to the finished shape, saving metal, as well as extra cutting and machining. The fine grain structure of Revere Brass makes it especially easy to cut, drill, thread, buff and plate. Its "*right*" shape permits fabricating the valves into assemblies which save installation time. In this way, Brass-Craft is able to produce a high-quality product at minimum cost.

In addition, these brass valves resist corrosion and are compatible with copper water tube. Thus they have ready acceptance with plumbing and building contractors, as well as home owners.

Once again it is proved that there is one "*right*" product for every application. A Revere T. A. (Technical Advisor) is available to help you get the one best for you. He is always ready to cooperate in seeking ways to save money and improve your product. Call or write today.

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The Iron Age SALUTES

Joseph N. Huser President of the National Tool & Die Manufacturers Assn. and an outstanding machine tool producer, he has served on U.S. trade missions to Europe; organized the Indiana Tool & Die Manufacturers Assn.

When Joseph N. Huser raps the gavel adjourning the 11th annual convention of the National Tool & Die Manufacturers Assn. in Hartford on Nov. 4, he will be completing the busiest year in a life of outstanding industrial accomplishment.

Aside from guiding the 1000-member NTDMA through the industry's all-time record year, Mr. Huser has been serving on two U.S. trade missions in Europe, plus operating his own firm, B & H Tool and Machine Corp. of Indianapolis. During September he was in Berlin as a staff member of the U.S. Information Center at the German Industries Fair. Earlier, he was on a similar assignment to Sweden.

The pace has been hectic, but to Joe Huser 1956 marks the peak of an industrial career that began more than four decades ago with an apprenticeship in a Cincinnati machine shop. Many a chip had fallen at his feet before he reached the top spot in the tool and die industry.

Born in Kentucky and raised in Indiana, he went to Cincinnati at 14 to attend night school, paying his keep by clerking in an uncle's grocery store. His mechanical inclinations led to the apprenticeship, and by the time he was 20, Mr. Huser was a maintenance foreman.

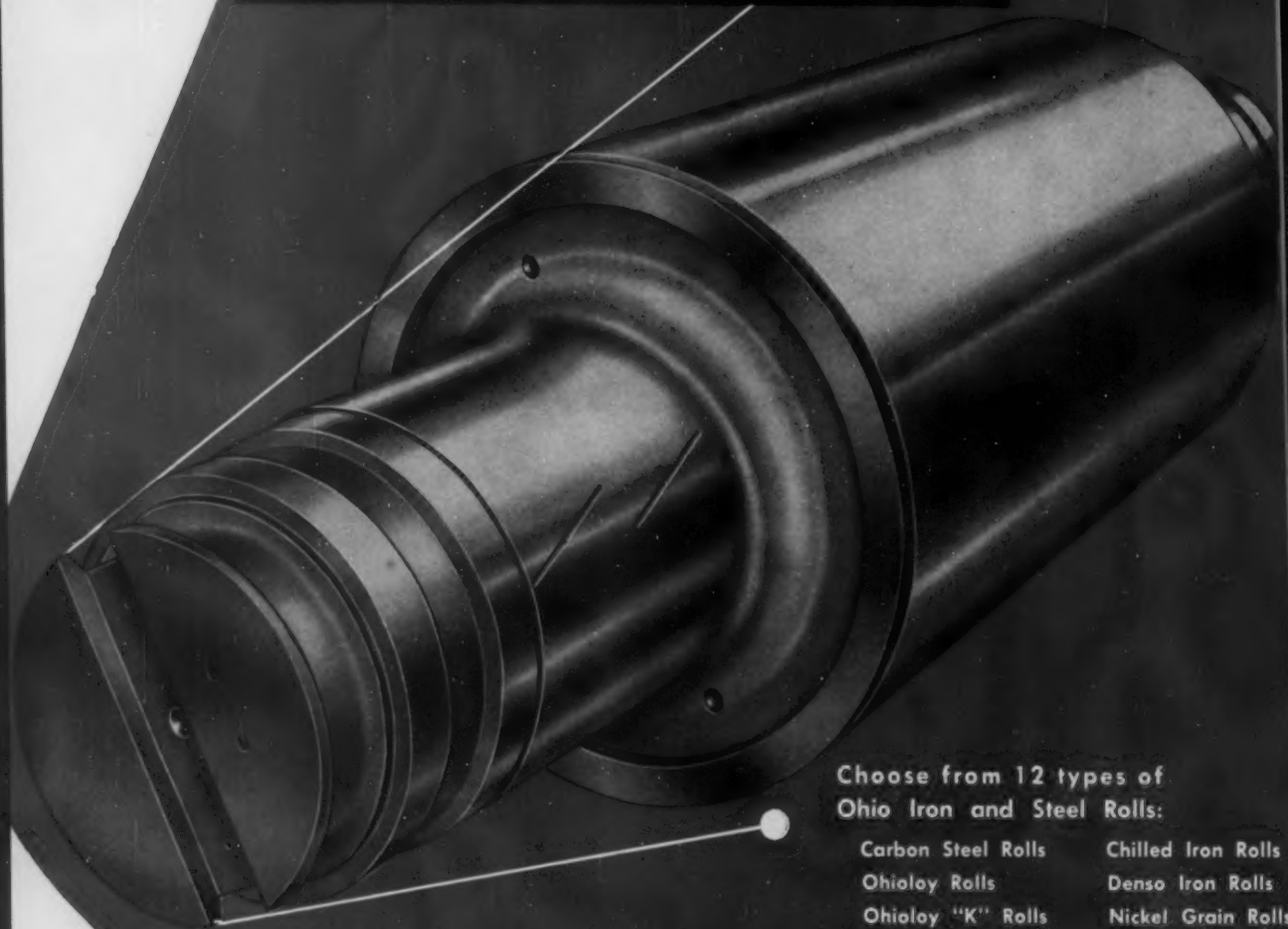
After a two-year hitch with the AEF during World War I, he became a toolmaker, then a chief inspector in Indianapolis. It was in the mid-1930's that he and a friend, Harry A. Buses, started an after-hours tool shop. By 1936, they started their own company.

Mr. Huser went on to organize the Indiana Tool & Die Manufacturers Assn., served as its first president. Later, he was elected president of the Indianapolis chapter of the American Society of Tool Engineers.

Another big source of satisfaction to Mr. Huser is his four sons—and the fact that they have followed him into the tool and die industry.

Ohio Rolls

shaping metal for all industry



Choose from 12 types of
Ohio Iron and Steel Rolls:

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- Ohioloy "K" Rolls
- Flintuff Rolls
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- Chilled Iron Rolls
- Denso Iron Rolls
- Nickel Grain Rolls
- Special Iron Rolls
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- Ohio Double-Pour Rolls
- Forged Steel Rolls

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Plants at Lima and Springfield, Ohio

OR4

The Iron Age INTRODUCES

Charles D. Gould, elected vice president and general manager, **American Hoist Pacific Co.,** Seattle, Wash.

Robert A. Beck, elected vice president, **City Tool Corp.,** Dayton, O.

Richard G. Lyall, elected vice president, engineering, **Adsco Industries, Inc.**

Cecil R. Russell, elected vice president, **J. B. Rea Co., Inc.,** Santa Monica, Calif.

George G. Gauck, elected vice president, sales, **Zero Manufacturing Co.,** Burbank, Calif.

Albert P. Stowe, Jr., elected treasurer, **Edgcomb Steel of New England, Inc.,** Milford, Conn.

Lewis A. G. Martorano, elected asst. treasurer, **Birdsboro Steel Foundry & Machine Co.,** Birdsboro, Pa.

Vernon L. Strohm, named general superintendent, **American Steel & Wire Co.,** Waukegan, Ill.

Dr. Donald P. LeGalley, named scientific staff consultant, AC Spark Plug Div., **General Motors,** Milwaukee.

Stanley J. Roush, named group vice president, **Borg-Warner Corp.,** Chicago.

Charles H. Shelton, named chief metallurgist, **The White Motor Co.,** Cleveland.

D. A. Hanan, named Eastern district manager, **Peterson Steels, Inc.,** Union, N. J.; **L. A. Wheeler,** named district manager, Detroit office.

R. K. Carleton, named technical advisor, **Wheeling Steel Corp.,** Benwood Works, W. Va.; **Franklyn D. Long,** named estimator.

John F. Welch, appointed general manager, Small Integral Motor Dept., **General Electric Co.,** Fort Wayne, Ind.

Marsh C. Bowers, named superintendent, Massillon coke plant, **Republic Steel Corp.; Frank N. Miller,** named superintendent, Canton coke plant; **Charles W. Hatheway,** named superintendent, Massillon blast furnace; **John L. Houser,** named superintendent, Canton blast furnace.

L. W. Long and **J. H. Burrus, Jr.,** named asst. general managers, **Allis-Chalmers Power Equipment Div.,** Milwaukee; **A. I. Thorsen,** appointed general manager, Terre Haute (Ind.) Works.

Robert E. Locke, appointed manager, highway sales, **Kaiser Aluminum & Chemical Sales, Inc.,** Chicago.

G. A. GILBERTSON, elected president and chief operating officer, The Frank G. Hough Co., Libertyville, Ill., subsidiary of International Harvester Co.

RICHARD W. BANFIELD, elected president and chief executive officer, The Motch & Merryweather Co.

MARVIN J. BAIR, elected vice president, sales, Pittsburgh Steel Co., Pittsburgh.

JAMES E. BROWN, elected vice president, American Steel & Wire Div. and general manager, Cyclone Fence Dept., U. S. Steel Corp.

These are typical of the many piece parts being balanced on the *low* cost, *high* production

TAYLOR

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Speed Button Control

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INTERNATIONAL DIVISION — DUMMANN WORLD TRADE CO., Milwaukee 6, Wisconsin, U.S.A.

George H. Parker, appointed manager, steel fabricating plant, **Luria Engineering Co.,** Chicago Heights, Ill.

Hillard M. Patton, named manager, Foundry Div., St. Paul plant, **American Hoist & Derrick Co.; Harry A. Anderson,** named manager, general manufacturing, St. Paul plant; **Walter R. Olson,** appointed production control manager, St. Paul and Ft. Wayne plants; **Ernest S. Egertson,** named chief industrial engineer, St. Paul plant.

Chester J. Selden, named district sales manager, midwest, **Silent Hoist & Crane Co.,** Brooklyn, N. Y.

Robert M. Clarke, appointed manager, sales, **The Precision Steel Corp.,** Bridgeport, Conn.

John G. Schaeffer, appointed manager, manufacturing, Oakland foundry, **General Metals Corp.,** San Francisco.

William J. White, appointed plant manager, **Carver Foundry, Inc.,** Fairview Village, Pa.

Ralph S. White, named manager, research and engineering, Spinco Div., **Beckman Instruments, Inc.,** Belmont, Calif.

Charles A. Shenberger, named general sales manager, **Erie Forge & Steel Corp.,** Erie, Pa.

Stewart H. Kilmer, appointed works manager, Ambridge, Pa., plant, Spang-Chalfant Div., **National Supply Co.,** Pittsburgh; **Ernest G. Unrath,** named vice president, manufacturing; **Myron J. Demeter,** named asst. works manager; **George H. Shiveley,** named general superintendent; **Herbert T. Buchholz,** named plant controller.

William J. Cleary, named manager, tubular steel products and cold finished steel bar sales, Philadelphia steel service plant, **Joseph T. Ryerson & Son, Inc.**

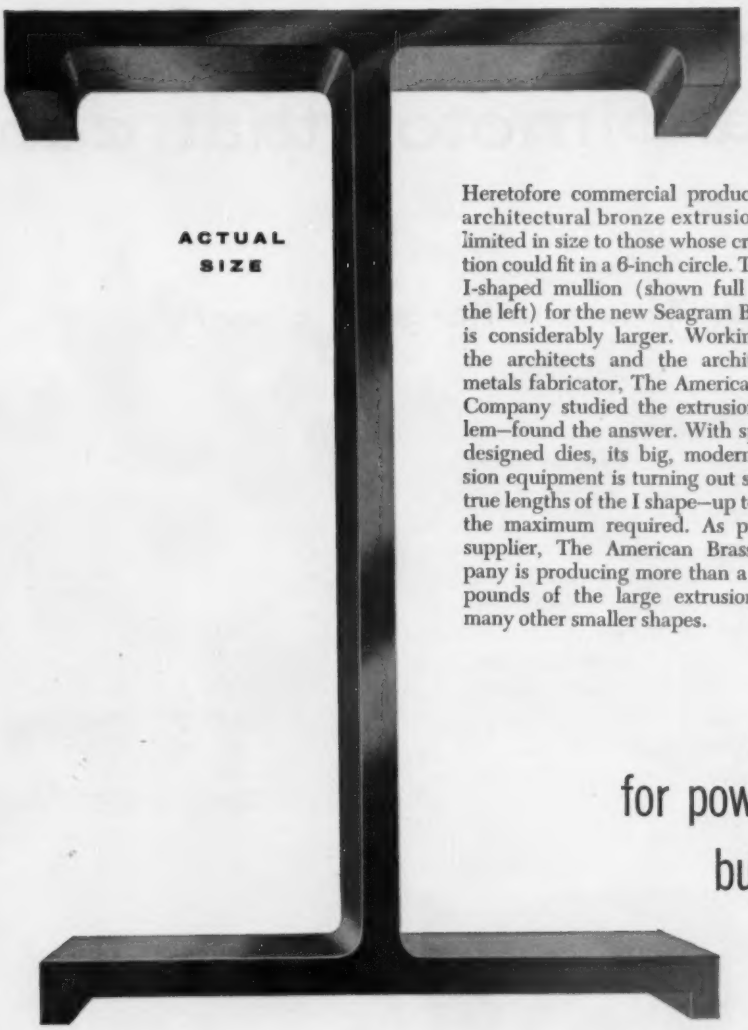
LOUIS G. HELMICK, elected vice president and general manager, Industrial Div., Joy Manufacturing Co.

ROY E. PINNIGER, named assistant to president, American Steel & Wire Div., U. S. Steel Corp.

JOHN C. CERCONE, named general manager, sales, Pittsburgh Steel Co., Pittsburgh

ROBERT F. REILLY, named controller, Loewy-Hydropress Div., Baldwin - Lima - Hamilton Corp., New York.

From the largest architectural bronze shape for this building...



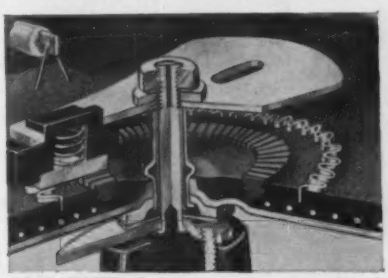
ACTUAL SIZE

Heretofore commercial production of architectural bronze extrusions was limited in size to those whose cross section could fit in a 6-inch circle. The new I-shaped mullion (shown full size at the left) for the new Seagram Building is considerably larger. Working with the architects and the architectural metals fabricator, The American Brass Company studied the extrusion problem—found the answer. With specially designed dies, its big, modern extrusion equipment is turning out straight, true lengths of the I shape—up to 26'4", the maximum required. As principal supplier, The American Brass Company is producing more than a million pounds of the large extrusions, and many other smaller shapes.

WORLD'S FIRST. The 38-story Seagram Building, now rising on Park Avenue in New York, is the first to use architectural bronze for the metal in its "curtain" walls. The large extrusion at the left forms the vertical mullions extending the full height of the skyscraper.

...to small extrusions for power rheostat contact buttons

Though not the smallest, the extruded shape, shown full size above, is typical of the hundreds of smaller industrial shapes produced by Anaconda. This extrusion has helped the Ward Leonard Electric Company, Mt. Vernon, N. Y., cut the cost of assembling its Vitrohm power rheostats.



COST CUTTER. Before using extrusions, Ward Leonard hand-assembled individual brass contact buttons—spacing them on a steel wire to hold in position while vitreous enamel was fired. The steel wire was then ground off. Now an extruded brass shape is accurately slotted, leaving a continuous line of buttons attached to a triangular projection. After firing, the projection is easily milled off. Ward Leonard gets absolute uniformity, with less effort and fewer rejects—and healthy savings.

ANACONDA has the experience and the modern equipment to make copper and copper alloy extrusions in a tremendously wide range of sizes and shapes – as indicated by these two examples. Imagination applied to the design and use of extruded shapes can cut direct labor costs – reduce machining operations – cut scrap – give improved product quality. For more information or help with your specific problems see your Anaconda representative. Or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

5671

ANACONDA®

Extruded Shapes

TOMORROW:

A standard motor that can

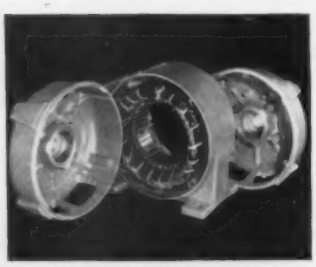
The new Life-Line A is another step closer

One of the principal causes of motor failure today is overloading. Right now Westinghouse is working on motor designs that will someday result in a motor that can survive any overload.

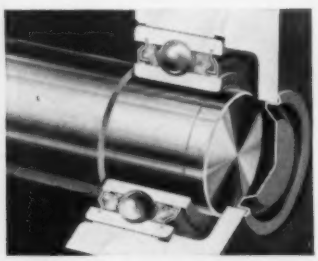
This picture shows a 15-hp Life-Line "A" motor pulling a quarter of a million pounds of locomotive on New York Central tracks near Buffalo. It's simply a dramatic way of showing the progress Westinghouse has made toward better overload protection. Improved insulation, frame construction and bearing design give the Life-Line "A" better protection against overloads than ever before. It's industry's closest approach to a standard motor that can withstand any overload condition.

Your Westinghouse sales engineer is ready to tell you about many other reasons why the Westinghouse Life-Line "A" is industry's most advanced and preferred motor. Call him today.

J-21925



New exclusive Bondite* impregnating varnish, partner to new Bondar* and Mylar† insulations, guarantees complete resistance to the heating effects of heavy overloads as well as motor contaminations.

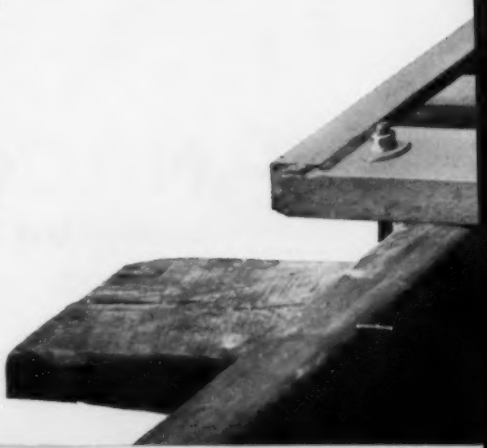


Exclusive Life-Line "A" prelubricated bearing features a new 4-way seal and completely excludes the three main causes of bearing failure: (1) contamination, (2) overgreasing, (3) wrong grease.

*Trade-Mark †Du Pont Registered Trade-Mark

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***



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Vulcan's reputation for highest quality goes with every shipment of VULground gage and die steel. Depend on it *regularly*. Send now for descriptive folder and prices.

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H. K. Porter Company, Inc.

Aliquippa, Pennsylvania

Offices and warehouses in principal cities

PERSONNEL

A. H. Wardwell, named asst. to vice president, operations, American Steel & Wire Div., **United States Steel Corp.,** Cleveland; **Jacob W. Cox,** named director, raw materials.

Frank E. Kyndberg, named general sales manager, Cyclone Fence Dept., American Steel & Wire Div., **U. S. Steel Corp.,** Waukegan, Ill.

Thomas S. Washburn, named manager, quality control, Harbor Works, **Inland Steel Co.,** Chicago; **Ross L. Harbaugh,** named superintendent, Chemical Dept.; **Michael Tenebaum,** named superintendent, Metallurgical Dept.; **Ernest F. Lundeen,** appointed superintendent, Service Dept.

Rex C. Corns, appointed asst. general superintendent, National Tube Div.'s Gary Works, **U. S. Steel Corp.**

Max H. Hofmann, named manager, sales, Washington district, **U. S. Steel Corp.,** Pittsburgh; **Loring S. Brock,** named asst. manager, Structural and Plate Steel Sales Div.

Henry J. Forsyth, named director, steel conservation and quality control, Youngstown district, **Republic Steel Corp.**

J. F. Costigan, appointed asst. director, manufacturing, **Allis-Chalmers Industries Group.**

Theodore J. Englund, appointed manager, industrial engineering, **Norton Co.,** Worcester, Mass.; **Paul L. Lantz,** named asst. manager, industrial engineering, **William F. Watts,** named factory manager, Refractories Div.; **William P. Densmore,** appointed chief industrial engineer, Refractories Div.

OBITUARIES

David S. Faulkner, 70, retired vice president, **The National Supply Co.**

William J. Brennan, Sr., 76, president, **Geneva Foundry Corp.,** New York.

New Ideas IN EQUIPMENT FOR CONTINUOUS COATING LINES

• New ideas recently developed by Aetna-Standard make Continuous Coating Lines more efficient. One idea focuses on a new approach for **Loop Cars.** The use of Loop Cars eliminates deep loop pit excavation and keeps strip in full view for easier inspection.

New Aetna ideas contribute to an even better finished product. Space saving in the installation results in lower first cost. There is less equipment to buy and to install.

Aetna-Standard has installed more Continuous Galvanizing Lines than all other manufacturers combined.

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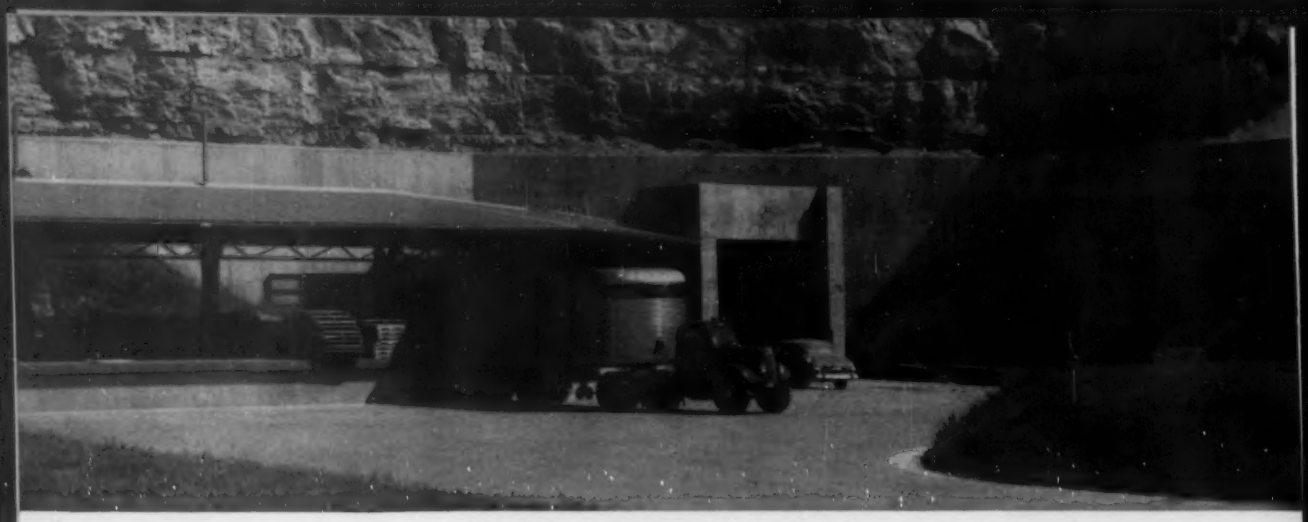
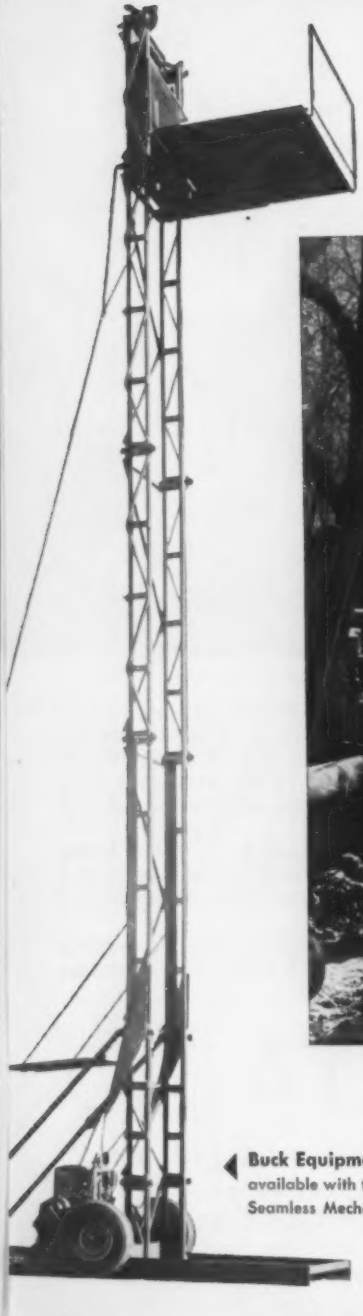
CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC



In the Refrigeration System of the Inland Cold Storage "cave" near Kansas City are more than three miles of National Seamless. Ranging from ⅜-inch to 10-inch dia., the pipe circulates brine and ammonia.

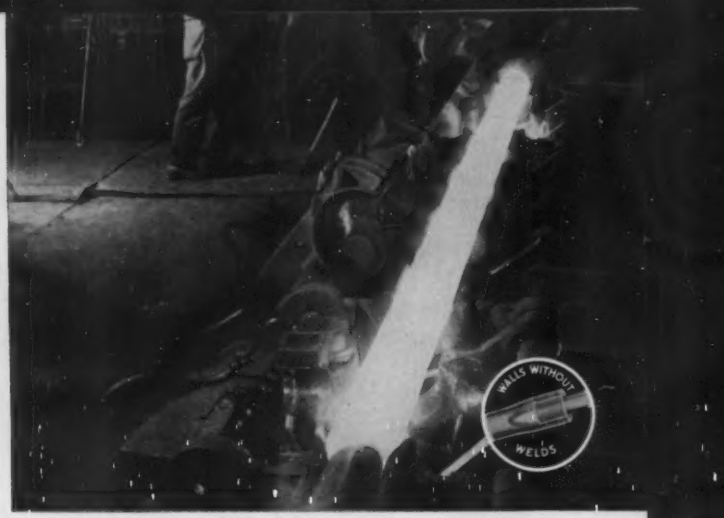
Backbone of a



Buck Equipment Corporation Hoisting Machines like this are available with towers up to 150 feet in height. Constructed of Shelby Seamless Mechanical Tubing, the sturdy, slender tower unfolds like a jack-knife—raises and lowers in just over 2 minutes. The platform zooms up its vertical track at 140 feet per minute.

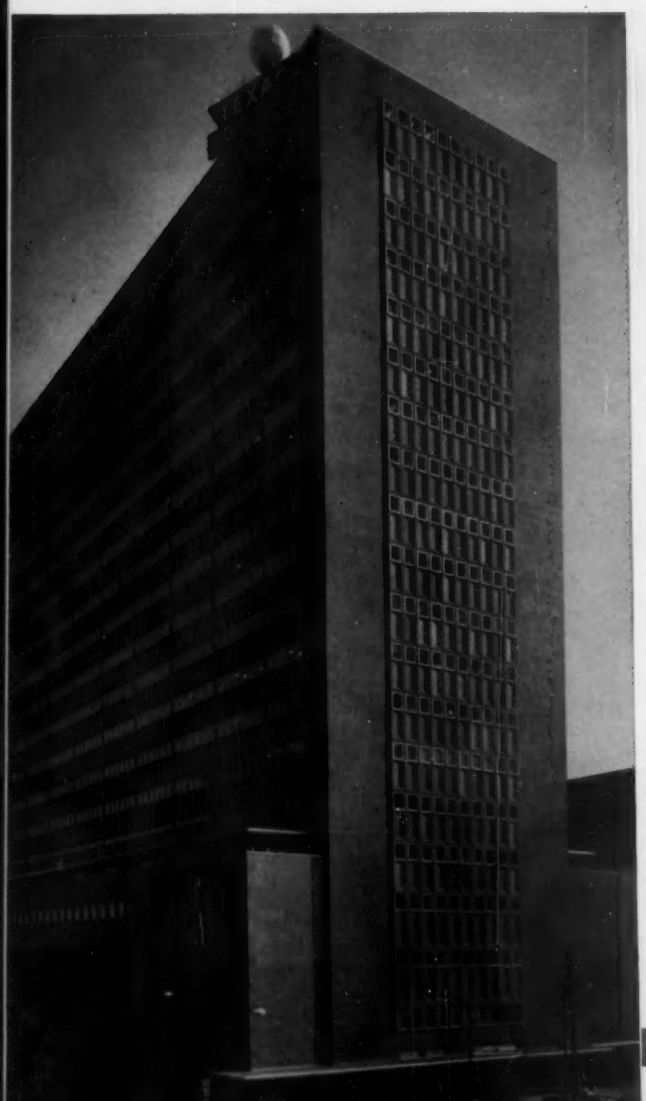
10,200 Tons of 10¾" National Seamless are being used in the world's first coal-carrying pipeline. A slurry mixture of coal and water will be pumped through the unique line at the rate of 1,200,000 tons per year. The line runs from Cadiz, Ohio to Cleveland Electric Illuminating Company's East Lake, Ohio, plant.

New England's Most Modern Power Station employed 25 miles, or 700 tons, of National Seamless Pipe in its construction. The Salem Harbor Station uses 250,000,000 gallons of sea water per day to condense steam for conversion to electric power. Annual output exceeds 1,000,000,000 kilowatt-hours.



The National Seamless Method of manufacture is one of the most difficult forging operations in the steel industry. A billet of the finest steel is actually pierced to produce a seamless tube with absolutely uniform wall strength. No longitudinal welds . . . no weaknesses.

Hundred Industries . . .



NATIONAL SEAMLESS PIPE AND TUBES

Ever see a ton of bricks soaring up a thin vertical track of tubing at 140 feet a minute? Or a pipeline that carries coal from the mine to potential customers a hundred miles away? These and many more technical miracles are realities today—with the help of National Seamless Pipe and Tubes.

The versatility of National Seamless is evident everywhere. It can be versatile because it is *so strong, so safe, so workable.* Its uniformity and dimensional accuracy are unquestioned. And National Seamless is available in a wide range of steel analyses, wall thicknesses and diameters. Every foot is produced to exact standards by the world's largest manufacturer of tubular steel products.

National Seamless might be just the answer to your tubular problem. Get in touch with National Tube. We will be pleased to help you in any way we can.

The New Texas National Bank at Houston employs National Seamless Pipe in a wide range of sizes for its vast heating and air-conditioning system. Sizes from 4" to 12" O.D. are used for chill and hot water lines, while 14" O.D. pipe forms part of the steam-handling system. 16" pipe is used for carrying condenser water.

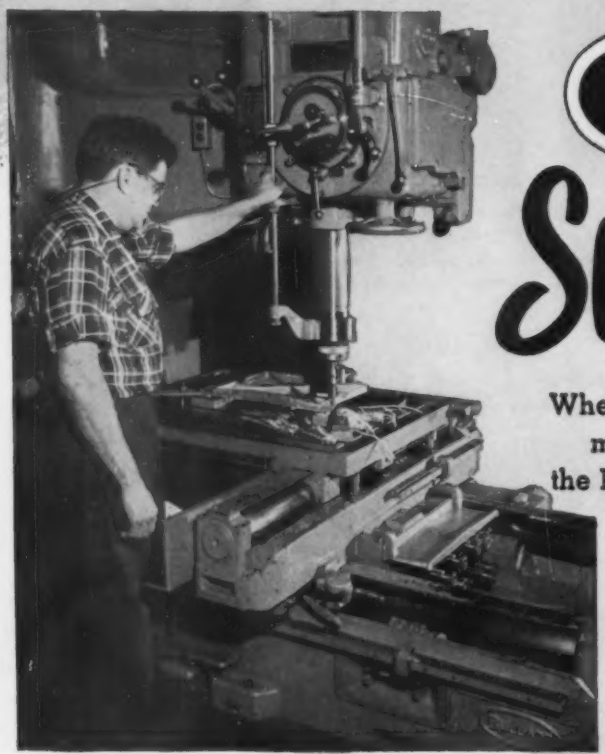
NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS NATIONAL SEAMLESS PIPE AND TUBES

UNITED STATES STEEL

ACCURATE LOCATING PERFORMANCE

Acclaimed By Customer with . . .



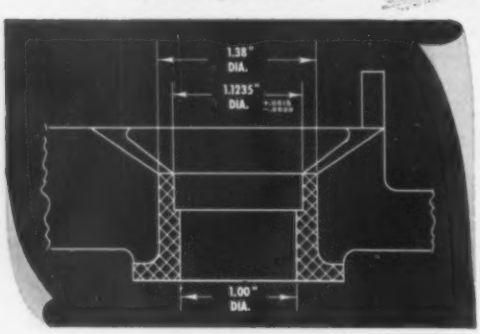
BULLARD Spacer Table

Where close tolerances must be maintained on repetitive pieces the Bullard Spacer Table is a "natural"

"The machine is simple to operate. We have found the Bullard Spacer Table very useful in our work", says a foreman at San Diego Division of Convair. "It eliminates the necessity of zeroing to a set position. And there is no chance for error, which is important when you make accurate parts for airplanes."

This same accuracy to close tolerances can be applied to your drilling, reaming or tapping operations without the high cost of jigs or fixtures.

Identical machining operations on each of three holes for battery carriage are performed on the Bullard Spacer Table.



OPERATION DATA

OPERATION	SET-UP TIME	UNIT TIME
Drill 1" dia.	.70	.2066
Counterbore 1.1235" dia. at 1.000 dia. .350" deep	.25	.0566
Face 1.38" dia.	.25	.0356

CALL YOUR NEAREST BULLARD REPRESENTATIVE OR WRITE FOR SPACER TABLE CATALOG TO

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BRIDGEPORT 2, CONNECTICUT

FEATURE ARTICLES

No mystery, really—

Save by Knowing Your Drawing Lubricant Ingredients

◆ Finding the right press-drawing lubricant by trial and error can be expensive... Understanding the basic lubricant types and their logical areas of use can help to insure getting the right one the first time.

◆ There are five principal classes of materials usually found in drawing lubricants... This article considers all five in detail, points out what they contribute to various lubricant blends, features detailed recommendations.

By LEON SALZ, Manager, Lubricants Div., Magnus Chemical Co., Inc. Garwood, N. J.

◆ ALL TOO OFTEN, press-drawing lubricants are known to their users by trade names only. Such meager identification means that they are frequently bought and applied on a trial-and-error basis. But this need not be the case. There is ample technical information available to dispel any mystery that tends to cloak the subject of press-drawing lubricants and their proper use.

Certainly, the importance of using the right lubricant cannot be over-emphasized. One obvious reason is that inadequate or incorrect lubrication is a frequent cause of difficulty in press-drawing operations. On the other hand, use of the right lubricant can often overcome minor shortcomings in die design or metal quality that would ordinarily cause a high rate of rejects.

Purpose of the lubricant is to provide a film between the workpiece and the punch and die. The film permits forming the workpiece under pressure with a minimum of friction and wear.

When work-tool pressures are low, straight mineral oil, general purpose soluble oil, or dilute soap solutions give satisfactory service because the forces are not great enough to rupture the lubricating film.

As pressures increase, compounds are required which contain sufficient "oiliness" in the form

of polar materials such as fatty oils, waxes and concentrated soaps. These materials adhere to metal surfaces, maintaining persistent monomolecular films where lubricants lacking sufficient oiliness would be squeezed out.

When pressures are very high, as in severe draws, the corresponding rise in work-tool temperatures reduces adherency of the oiliness materials. Some form of extreme pressure (EP) material is then usually required to prevent welding or seizure between tool and work surfaces. EP agents function either chemically or mechanically. Those in the chemical group usually contain loosely combined chlorine or sulphur which react with the punch, die and workpiece to form weld-resistant films. Mechanically functioning EP agents minimize friction with powdered spacing agents (pigments) such as chalk or graphite.

Final lubricant's a blend

Actually there are five principal classes of materials found in press drawing lubricants. In addition to the oiliness and EP agents already mentioned, there are also emulsifiers, diluents and inhibitors. From these five categories, the lubricant manufacturer selects appropriate individual materials or mixtures of materials and blends them into a final lubricant that will do the required job.

It is worthwhile to consider each of the five classes separately and in detail, noting the characteristics that are common to all substances in a class as well as the variations that occur within each group.

Oiliness Agents—These organic compounds have a minimum of 14 carbon atoms and possess one or more polar groups such as the carboxyl group present in fatty acids, the carbonyl group present in fats, and the hydroxyl group present in alcohols. The long carbon chain does not have an affinity for metal and stands out at a perpendicular from metal surfaces. Thus, in metal drawing, tool and work surfaces are separated by a distance equal to two lengths of carbon chains.

The most common oiliness agents are: (1) fatty acids, such as stearic, oleic and palmitic acid; (2) fatty oils and fats (actually "glycerides" of chemically combined glycerine and fatty acids), such as tallow, lard oil, caster oil and neatsfoot oil; (3) soaps, typified by sodium stearate, potassium stearate, sodium oleate and the like; (4) waxes, such as beeswax and Carnauba wax; (5) synthetic modifications of natural fatty materials, such as partially esterfied glycerides and polyalkalene glycols.

Extreme Pressure Agents—As mentioned previously, chemical or mechanical types of EP agents help to prevent moving metal surfaces from welding together under conditions of high temperature and pressure. Chlorinated and sulphurized compounds are the most widely used EP agents of the chemical type.

In this connection, newly developed chlorinated compounds are displacing sulphurized products in many applications. They combine oiliness properties with excellent EP qualities and have no objectionable odor. And they are especially useful in drawing stainless and other alloy steels. However, care must be taken in their use with plain carbon steels because there is a possibility of corroding the work if the compound decomposes partially to form hydrochloric acid. Use of chlorinated compounds on copper alloys may also be limited due to surface staining.

Characteristics vary considerably

The EP characteristics of sulphurized compounds vary considerably. Effectiveness depends upon the so-called "activity" of the sulphur as well as the amount of compound incorporated in the lubricant. An active sulphur releases readily under high temperature and pressure to form a weld-resistant sulphide on drawing tools and workpieces.

Active, so-called "corrosive" sulphur compounds contain about 16 pct sulphur compared with about 12 pct contained in inactive, noncorrosive grades. Corrosive types are used for drawing ferrous materials but will discolor copper, brass and bronze with a black stain. Accordingly, non-corrosive sulphur compounds are used in drawing lubricants for the copper alloys.

Mechanical type EP agents include chalk,

Classification of Press-Drawing Lubricants

(Numbered for use with Recommendation Chart)

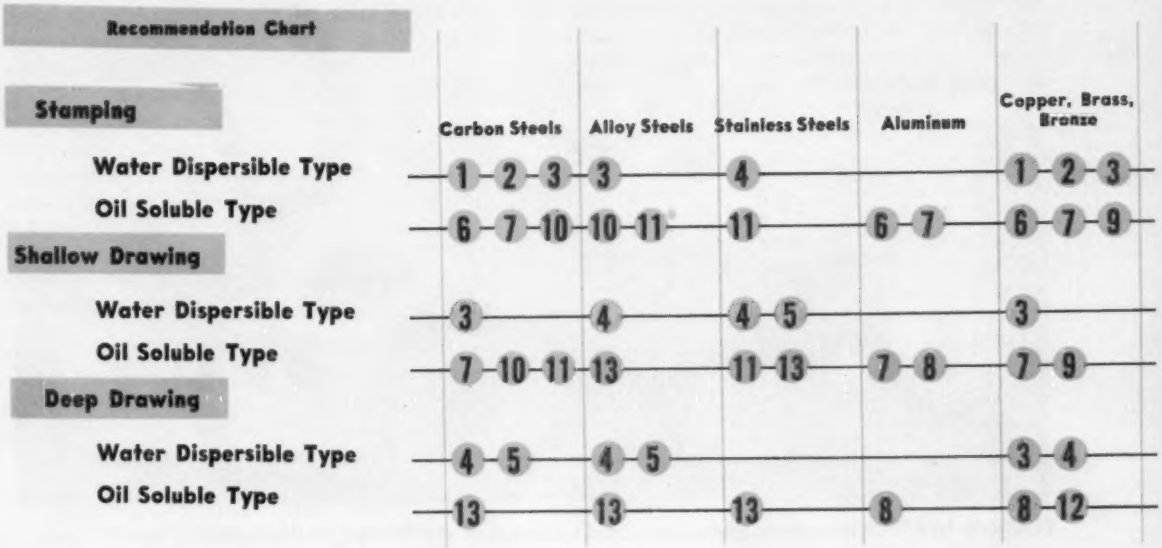
Water Dispersible Types

1. Soluble oil
2. Soap solution
3. Non-pigmented soap-fat compound
4. Pigmented soap-fat compound
5. "Dry-film" soap

Oil Soluble Types

6. Straight mineral oil
7. Mineral oil-oiliness agent blend
8. Straight fatty oil (or equivalent oiliness agent)
9. Mineral oil-sulphurized oil blend (noncorrosive)
10. Mineral oil-sulphurized oil blend (corrosive)
11. Mineral oil-chlorinated oil blend
12. Straight sulphurized oil
13. Straight chlorinated oil

Recommendation Chart


Stamping
Carbon Steels
Alloy Steels
Stainless Steels
Aluminum
Copper, Brass, Bronze
Water Dispersible Type
1 2 3 3 4 1 2 3
Oil Soluble Type
6 7 10 10 11 11 6 7 6 7 9
Shallow Drawing
Water Dispersible Type
3 4 4 5 3
Oil Soluble Type
7 10 11 13 11 13 7 8 7 9
Deep Drawing
Water Dispersible Type
4 5 4 5 3 4
Oil Soluble Type
13 13 13 8 8 12

borax, lithopone, zinc oxide, white lead, talc, graphite and mica. The latter three possess inherent lubricating ability and are termed "solid lubricants." They lessen friction but do not pulverize under high pressure as do the other materials.

Emulsifiers—These materials permit the use of water-insoluble components in water-base drawing lubricants. Sodium and potassium soaps, which also function as oiliness agents, are the emulsifiers used most widely. Potassium soaps are softer, dissolve more easily and are usually preferred for liquid and paste type lubricants. However, the newly developed "dry film" lubricants consist principally of a sodium soap and a water soluble spacing agent, such as borax.

Diluents—These are low-cost "carriers" or "extenders" for the more expensive and essential components of a drawing lubricant. Water, mineral oil and petroleum solvents are most commonly used. Diluents also dissipate heat formed during drawing operations; here, water's about twice as effective as petroleum oils.

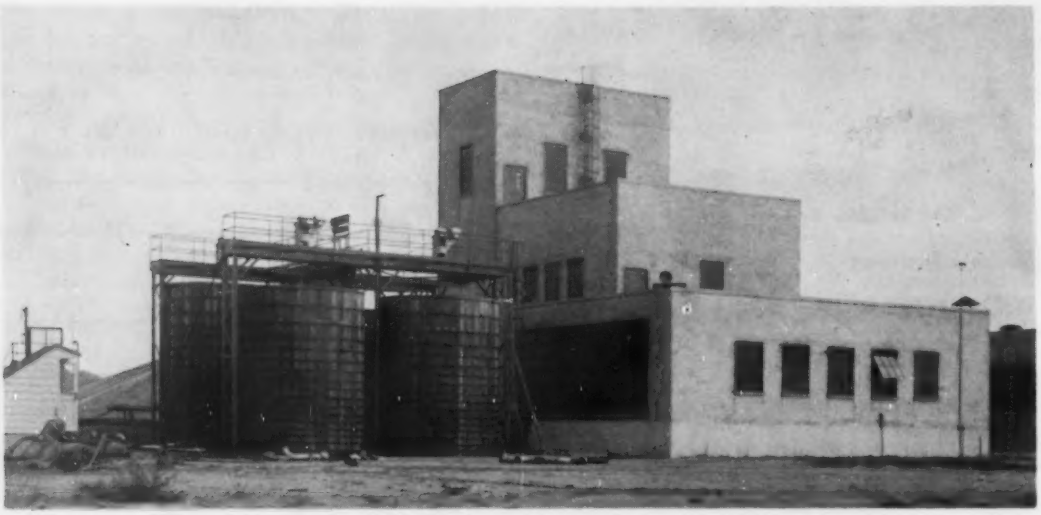
Inhibitors—These chemical additives retard rust formation, foaming, bacteriological decomposition, oxidation and other undesirable tendencies inherent in some lubricants.

Typical water-dispersible or oil-base lubricants compounded from these five classes of basic materials are listed in an accompanying table. Recommendations for most efficient use of these lubricant types are shown, also.

■ *Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept.,* THE IRON AGE, *Chestnut & 56th Sts., Philadelphia 39, Pa.*

Your Press-Drawing Lubricant Should Be:

Efficient.	It should have adequate oiliness combined with EP qualities where necessary to minimize rejects and metallic build-up on tools.
Physiologically Safe.	Check for absence of skin-irritating chemicals, presence of germicide additives.
Non-Corrosive.	Seek one that will not cause rusting, staining or discoloration. Prevention is less expensive than curing these problems.
Stable.	Storage stability over a winter-summer temperature range is important. Components should not separate, nor become rancid.
Easy to Apply.	Continuously-circulated lubricants should be non-foaming. Others should coat thoroughly by dip, spray, roller or wiping methods.
Easy to Remove.	But look out for this one! The lubricant that is easiest to remove may not be the one to do the best job of reducing rejects.
Economical.	Actual lubricant cost is a minor item. Choose the one that reduces your overall production costs most effectively.



PLATING WASTES from Auto-Lite's Lockland, O., operations are treated in this modern plant.

How Are We Handling Industrial Waste Problems?

◆ As industry has mushroomed since WW II, metals plants have buckled down to increasingly important problems of industrial waste disposal... Trend is toward stricter governmental regulation ... Recovery possibilities also figure in.

◆ What has industry learned? ... Based on extensive work done in five major pollutant areas, answer is, lots, much of it applicable to individual problems ... Here's how solids, oils, phenols, plating wastes, pickle liquors are being handled.

By T. F. Barnhart,
Chemical Plants Div.,
Blaw-Knox Co.,
Pittsburgh

◆ SINCE WORLD WAR II, industrial waste disposal has posed increasingly important problems for metals industries. Many states have passed rigid regulations governing stream-pollution abatement; others lean in that direction. The trend is definitely toward stricter and more standardized control.

Result has naturally been greater industrial attention to waste problems. But what has industry learned? What treatment measures are being used, and what developments are expected in industrial waste disposal?

Blaw-Knox Co.'s Chemical Plants Div. is one of a number of design contracting firms specializing in such problems.

For discussion purposes, let's consider there are five pollutant types requiring treatment.

First is removal of solids suspended in water. In steel mills, scale resulting from hot-rolling operations and carried in cooling water is such a source. Readily settleable, this is generally removed in scale pits. Rigidly enforced pit-cleaning schedules are of prime importance for efficient operation.

Many plants water-sluice ashes from boiler installations for removal. Thus wetted, ashes settle readily in simple rectangular basins for easy removal, often by clam bucket.

Most troublesome solids removal problem is that of finely divided iron oxide suspended in waste water from blast furnace and sintering plant air cleaners. Generally, Dorr-type thickeners are used to concentrate solids for efficient removal. Reclaimed solids may be sintered and recharged to blast furnaces.

Oil waste removal has two aspects. Lube oils (for our purposes, those insoluble in water) can be separated by gravity in oil separators and either reclaimed or burned. Soluble oils require preliminary heat or chemical treatment to break emulsions before gravity separation.

With most cutting oils, the emulsion-breaking operation must be supplemented by a chemical floc treatment to produce a satisfactory effluent.

Some such twin treatments for soluble oils produce effluents with as low as 10 to 30 ppm of residual oil.

Phenol wastes originate from by-product coke oven operations, principally ammonia still liquor since most plants eliminate discharge of final cooler water by recirculation. Some 20 to 25 gal of ammonia still liquor are produced per ton of coal carbonized, and will contain about 2000 ppm of phenol. Several companies have experimented unsuccessfully with biological oxidation of such liquors.

Commercially accepted methods

Probably the Koppers Vapor Recirculation System was the first commercially accepted phenol recovery process. This utilizes steam and caustic to reduce phenol concentration to about 100 to 200 ppm. A second method is benzol extraction, forming sodium phenolate.

Some companies are experimenting with fortified solvents to improve extraction efficiency. Blaw-Knox is investigating a German butyl acetate extraction process capable of reducing phenol to a maximum of 50 ppm, with 1/10th the solvent required for benzol extraction. Recovery is as a crude phenol stock.

Plating wastes are of either the alkaline or acid variety. Principal pollutant of alkaline waste is cyanide which is extremely toxic. Alkaline chlorination, in the writer's opinion, is the only treatment which has proved satisfactory. This produces a cyanate some 500 times less toxic than cyanide.

Some states permit discharging waste in the cyanate form. Others are stricter, requiring a second-step chlorination treatment.

Most toxic plating solution is chromic acid. Removing chromium calls for adding a reducing agent like ferrous sulphate in a 16-parts-to-one-part-chromium ratio. A more efficient method, since it adds no ferrous iron for later removal, is to use sulphur dioxide applied with commercially available sulfonators.

After removal of cyanide and reduction of chromium, both alkaline and acid plating solutions require neutralization and removal of toxic metals, usually by precipitation as metal hydroxides and removal by settling.

Disposal of the gelatinous sludge obtained has been handled through lagooning or, sometimes, with vacuum filtration to reduce volume.

Recently, ion exchangers have been used to advantage in chromium plating to reclaim a large portion of chromium lost in rinse water.

Approximately 600 million gals. of pickle liquor produced annually have added up to another major metalworking treatment problem. At present, lime neutralization is almost always used. Aside from cost, this produces excessive volumes of gelatinous sludge which never completely dries, requiring permanent condemnation of land used for lagoon disposal.

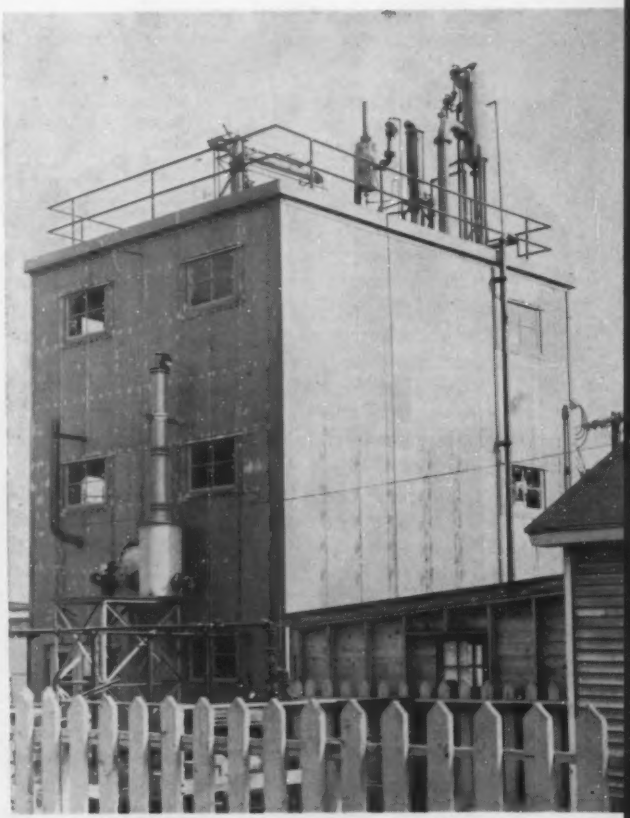
Recent experiments in vacuum filtration to reduce sludge volume, and in pre-conditioning sludge for better vacuum filtration, have greatly reduced sludge quantity. More important, once filter-dried, the product will continue to dry to a solid, eliminating need for lagoons.

In recovering chemicals from waste pickle liquor, a number of processes will now recover the free acid for reuse in pickling, while producing ferrous sulphate as a by-product. No commercial applications have been found since there's no market for the ferrous sulphate produced. Further, it cannot be dump-discharged without leaching into nearby waters.

Considerable attention is also being given to the possibility of making ammonia sulphate from waste pickle liquor by reacting it with coke oven gas. This is still experimental.

Blaw-Knox for the past four years has been developing a new recovery process to recover the entire sulphate equivalent of the waste pickle liquor as reusable sulphuric acid, and the iron as a high-purity iron oxide. Advantages are that no waste products requiring disposal are produced and all by-products can be re-used at the plant location.

Seven major steel companies and Blaw-Knox are now participating in a pilot plant program based on this recovery process.



WASTE PICKLE LIQUORS are pilot-plant treated to yield sulphuric acid, high-purity iron oxide.

Modify 12 Pct Cr Steels For Better Properties

◆ Cast or wrought, the 12 pct chromium steels are among the most widely used of all stainless grades . . . Low alloy content, high strength, good corrosion and heat resistance are a few of the properties that account for their popularity.

◆ But as a substitute for austenitic grades, the 12 pct Cr steels require modification for optimum properties . . . Here is a comprehensive review of the effects of various modifications in chemistry aimed at developing new 12 Cr grades that are metallurgically superior.

By PAUL SHAHINIAN and J. R. LANE, Metallurgists,
Metallurgy Div., Naval Research Laboratory, Washington, D. C.

◆ IT IS NO LONGER mandatory to use austenitic steels for service in highly stressed parts at temperatures above 1000°F. Ferritic steels—relatively low in alloy content—have now been developed which show promise for application at temperatures up to 1200°F.

Use of these ferritic grades is obviously desirable from the standpoint of conservation of strategic materials. But—as is less generally understood—these materials can also contribute to lower costs, easier processing, and higher room-temperature yield strength. No longer mere substitutes, they have a number of inherent selling points.

The possible usefulness of ferritic steels was pointed up by the higher strengths which were obtained in a recent investigation of 12 pct Cr alloys conducted by the Naval Research Laboratory, Washington, D. C. The tests were conducted with eight small experimental heats to which additions of molybdenum, vanadium, columbium, titanium, and carbon were made.

The test heats, listed in Table 1, were melted in a small induction furnace and cast into 70-lb ingots. Transverse sections were cut from the ingots both for forging and preparation of cast specimens. The pieces were forged at 2050°F into ⅝-in. square rods.

Preliminary to the evaluation of the materials, the influence of variations in heat treatment on the creep-rupture properties of this type of steel was determined for background information and also to serve as a guide in the selection of the optimum heat treatment. The study was made with a single forged heat (X), which was subjected to variations in austenitizing temperature, cooling rate, and tempering.

Compare cast and wrought

The normalizing heat treatment selected for the forged material consists of holding for 2 hours at 2100°F and cooling at a retarded rate (simulated air cooling of 4-in. round).

The creep and rupture properties of the various modifications were appraised in the following conditions: as cast; cast, homogenized at 2100°F for 2 hours; forged and normalized; and forged, normalized, and tempered at 1250°F for 4 hours. Creep-rupture tests were

TABLE I Chemical Compositions of Steels

Heat	Chemical Composition (%)						
	C	Si	Mn	Cr	Mo	V	Others
X	0.19	0.24	0.40	11.8	0.51	0.80	0.21 Cb
P	0.15	0.08	0.49	11.3	0.49	0.70	0.14 Cb
Q	0.16	0.18	0.50	11.5	0.55	0.68	
R	0.17	0.19	0.52	11.9	0.55	0.70	0.17 Ti
S	0.17	0.15	0.49	11.3	1.01	0.69	
W	0.23	0.22	0.47	11.2	0.97	0.75	
T	0.19	0.35	0.46	11.3	0.91	1.20	
U	0.15	0.19	0.48	11.5		1.05	

conducted using specimens of 0.250-in. diam by 1.25-in. gage length at 1100° and 1200°F in the stress range of 13,000 to 50,000 psi.

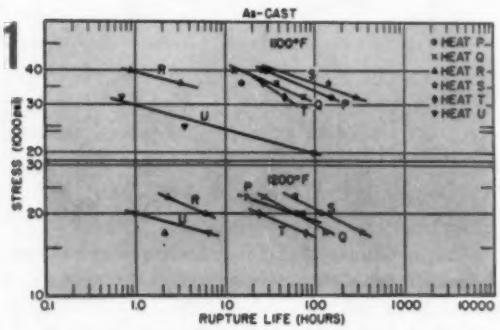
The influence of heat treatment on the creep and rupture properties of Heat X was found to depend generally on cooling rate, but only to a small extent if the rate was faster than a critical value. Of the various heat treatments, the oil quench and temper produced the lowest minimum creep rate, but the resulting rupture life was no greater than for some of the slower cooling rates. The air-cooled and control-cooled materials showed about the same creep resistance.

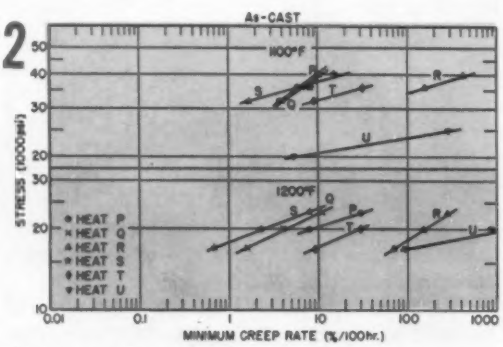
At slightly lower cooling rates, the properties became inferior. This seems to indicate that the material in sizes larger than a 4-in. round, when air cooled, develops a microstructure with poor creep-rupture strength. Tempering the control-cooled material at 1200°F lowered creep resistance at 1100°F, but had no effect on the properties of steel tested at 1200°F.

Solution helps properties

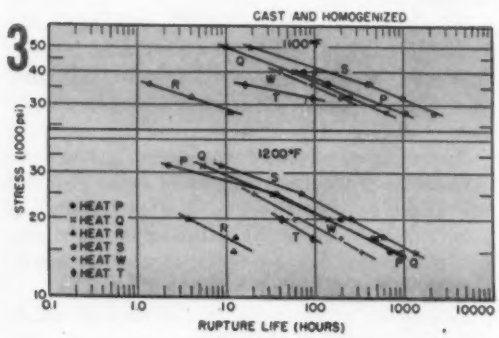
The properties were enhanced by austenitizing at 2100°F instead of 1850°F. The improvement was probably due to the greater solution of alloying elements and the increase in grain size at the high temperature. No significant change in the amount of free ferrite was observed.

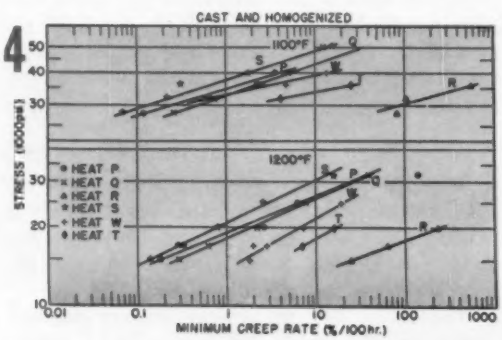
For the subsequent evaluation of the modifications, the retarded cool treatment from 2100°F was chosen, from practical considerations, over the oil quench which gave slightly better creep properties. It was thought that this normalizing treatment might show up those





FIGS 1 & 2—Log rupture life (1) and log creep rate (2) vs log stress plot for as-cast steels.





FIGS 3 & 4—Log rupture life (3) and log creep rate (4) versus log stress plot for cast and homogenized steels at 1100° and 1200°F.

TABLE II — Rupture and Creep Strengths of Cast Steels

Condition	Temperature (°F)	Heat*	Rupture Strength† (psi)		Creep Strength (psi)	
			100 hours	1000 hours	0.01%/hr	0.001%/hr
As Cast	1100	P	34,000 (6)	25,000	24,000	
		Q	31,000 (5)	22,500	23,000	
		R	27,000	—	21,000	
		S	36,000 (20)	28,000	30,500	
		T	27,000 (18)	—	26,000	
		U	20,000 (30)	16,000	18,000	
	1200	P	19,000 (14)	14,500	16,000	
		Q	18,500 (9)	12,500	16,000	
		R	13,500	—	7,000	
		S	21,000 (21)	14,500	18,000	
		T	16,500 (60)	12,000	12,500	
		U	13,500	—	12,500	
Cast and Homogenized	1100	P	38,000 (13)	28,000 (14)	34,500	27,500
		Q	37,000 (15)	26,000 (5)	33,000	25,000
		R	23,000	—	20,000	—
		S	42,000 (4)	32,000 (7)	37,500	29,000
		W	35,500 (24)	25,000 (12)	33,000	27,500
		T	32,000 (29)	—	29,000	—
	1200	P	21,000 (24)	14,500 (22)	19,000	13,700
		Q	21,000 (22)	14,500 (17)	18,000	13,000
		R	11,500	—	10,000	—
		S	23,000 (21)	15,500 (12)	21,000	14,200
		W	18,500 (27)	12,500	14,000	9,000
		T	17,000 (32)	10,500	12,000	—

*P: 0.5% Mo, 0.7% V, 0.14% Cb. Q: 0.5% Mo, 0.7% V. R: 0.5% Mo, 0.7% V, 0.17% Ti. S: 1.0% Mo, 0.7% V. T: 0.9% Mo, 1.2% V. U: 1.0% V. W: 0.23% C, 1.0% Mo, 0.7% V. † Numbers in parentheses indicate estimated elongation at fracture in per cent.

heats which were not fully hardenable in large sections, since at a slightly slower cooling rate inferior properties would result.

The room-temperature tensile properties of the cast and homogenized materials, compared to the normalized and tempered, differ mainly in the ductility. Elongation and reduction of area were low in the cast-homogenized condition, but high in the normalized-tempered condition. With the exception of the 1.05 pct vanadium heat (U), tensile and yield strengths of the various materials did not differ appreciably.

Cast alloys vary

Rupture life and minimum creep rate for the cast materials are plotted versus stress in Figs. 1 and 2, and for the cast and homogenized materials in Figs. 3 and 4. Each point on the graph represents an individual test.

The alloys may be compared more conveniently on the basis of creep and rupture strengths. Those of the cast steels are listed in Table 1. Homogenization was usually, but not always, beneficial. Heat R, containing titanium, was the exception.

The strongest of the cast-homogenized alloys, based on both rupture and creep strength, was Heat S (1 pct Mo, 0.7 pct V). Following in order of decreasing strength were Heats P, Q, W, T, and R. Presence of columbium (P) improved strength over that of the base composition (Q). Titanium (R) lowered the strength appreciably.

One heat (W) similar in composition to (S), but with a higher carbon content, was inferior in strength. Also, the substitution of a higher vanadium content (T) produced poorer properties.

The order of strength was generally the same regardless of whether rupture or creep strength was taken as the criterion. Microstructures of some of the heats in the cast-homogenized condition revealed large quantities of free ferrite in Heats R and U, the weaker alloys.

The order of strength in the as-cast condition was the same as in the homogenized, with only a few exceptions. Heat U, tested only as-cast, was among the weakest of the alloys. Heat W was not tested in the as-cast condition.

The rupture life and minimum creep rate data for the forged steels in the normalized condition are plotted in Figs. 5 and 6, and in the normalized and tempered condition in Figs. 7 and 8. Comparing rupture and creep strengths listed in Table 3, it can be seen that tempering at 1250°F for 4 hours lowered the strength at both 1100° and 1200°F for the stress levels considered.

Alloys and structures linked

The forged steels ranked slightly differently, in order of merit, from the cast steels according to Tables 2 and 3. Alloys in the cast-homogenized condition were generally slightly stronger than the forged-normalized alloys. Heat S was an exception.

This heat (S) was the strongest of the normalized alloys in terms of either rupture or creep strength. Following in approximate order of decreasing strength were Heats X, Q, P, T, R, and U. Heat W, not tested in the untempered condition, was one of the top four normalized and tempered alloys and was about equal in strength to Heat X.

The order of strength of the alloys in the normalized and tempered condition was the same as for the normalized alloys except for the case at 1200°F where Heat Q was superior to Heats W and X.

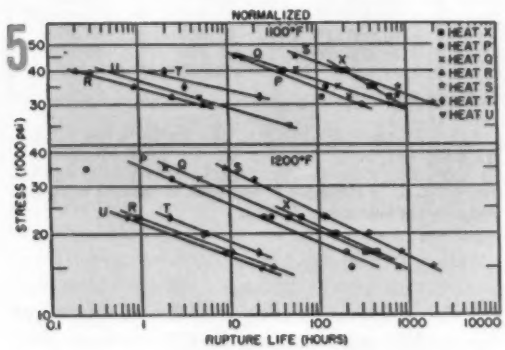
The enhancement of the creep properties of 12 pct Cr steels by additions of columbium was not always observed. At 1100°F the alloy (X) which contained 0.21 pct Cb had greater strength than a similar heat (Q) without columbium. But heat (P), with 0.14 pct Cb, had lower strength than Heat Q.

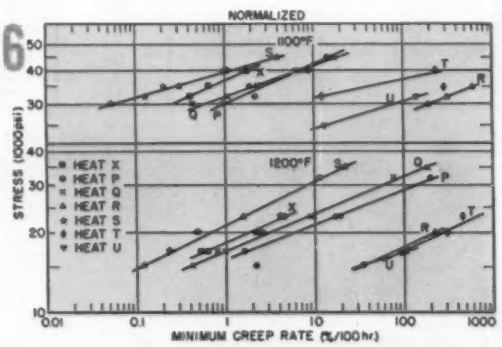
The substitution of 0.17 pct Ti (Heat R) resulted in markedly inferior creep properties. An improvement in high temperature strength was obtained by increasing the molybdenum content of the base composition from 0.5 to 1.0 pct.

One alloy (W), similar to the 1 pct molybdenum heat, but with higher carbon content (0.23 pct), showed poorer creep resistance.

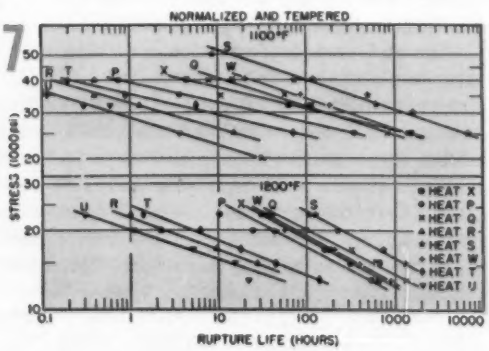
The influence of the alloying elements on strength appears to be largely associated with the structure at the austenitizing temperature. The 12 pct Cr steels in the austenitizing region border the gamma loop and therefore are sensitive to compositional changes.

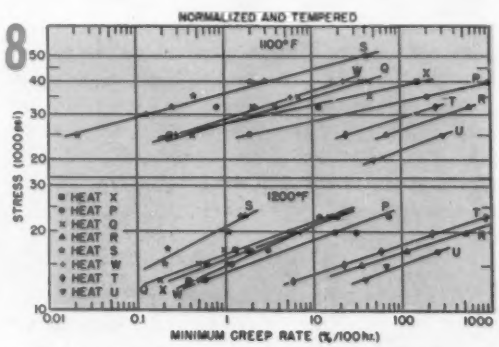
Additions of ferrite-forming elements (Si,





FIGS 5 & 6—Log rupture life (5) and log creep rate (6) versus log stress plot for normalized (wrought) steels at 1100° and 1200°F.





FIGS 7 & 8—Log rupture life (7) and log creep rate (8) versus log stress plot for normalized and tempered steels at 1100° and 1200°F.

TABLE III — Rupture and Creep Strengths of Forged Steels

Condition	Temperature (°F)	Heat*	Rupture Strength† (psi)		Creep Strength (psi)	
			100 hours	1000 hours	0.01%/hr	0.001%/hr
Normalized	1100	X	46,000 (19)	29,000 (11)	37,000	26,000
		P	35,000 (28)	25,500 (19)	30,000	21,500
		Q	37,000 (20)	28,500 (18)	32,000	24,500
		R	23,000	—	15,500	—
		S	43,000 (12)	32,500 (6)	39,000	31,500
		T	28,500 (15)	24,000	27,000	—
		U	23,000 (32)	18,000	19,500	—
	1200	X	21,000 (24)	15,000 (18)	18,000	13,000
		P	18,500 (30)	13,500 (24)	16,000	12,000
		Q	20,500 (26)	14,500 (24)	17,000	12,500
		R	13,000	—	9,000	—
		S	24,000 (26)	16,500 (25)	21,000	14,500
		T	14,000	—	9,000	—
		U	12,500 (50)	—	10,000	—
Normalized and Tempered	1100	X	31,000 (24)	26,000 (24)	27,500	23,500
		P	27,500 (25)	23,000 (25)	24,000	20,000
		Q	31,500 (21)	24,500 (20)	27,500	22,000
		R	21,000 (30)	17,000	15,500	—
		S	40,000 (16)	31,000 (16)	36,000	29,000
		W	34,000 (30)	26,000 (24)	28,500	22,500
		T	24,500 (31)	20,000	18,000	—
		U	18,000 (35)	14,000	12,500	—
	1200	X	18,500 (30)	12,500 (20)	15,500	11,500
		P	17,500 (38)	12,000 (40)	14,000	10,500
		Q	20,000 (35)	14,000 (25)	16,500	12,500
		R	13,000 (50)	10,000	10,000	—
		S	23,500 (21)	16,000 (21)	21,000	14,000
		W	19,000 (23)	12,500 (26)	15,000	10,500
		T	13,500 (59)	10,000	10,500	—
		U	12,000 (30)	9,000	9,000	—

*X: 0.5% Mo, 0.8% V, 0.21% Cb. P: 0.5% Mo, 0.7% V. R: 0.5% Mo, 0.7% V, 0.17% Ti. S: 1.0% Mo, 0.7% V. T: 0.9% Mo, 1.2% V. U: 1.0% V. W: 0.23% C, 1.0% Mo, 0.7% V. † Numbers in parentheses indicate estimated elongation at fracture in percent.

Mo, V, Ti, Cb) contract the gamma loop, whereas austenite formers (C, Mn, Ni) extend it. Only when the steel is wholly austenitic, completely within the gamma loop, can it undergo full transformation and be properly hardenable.

If the composition of the steel falls in the alpha plus beta region, there is only partial response to heat treatment, resulting in a two-phase structure containing free (delta) ferrite. The presence of delta ferrite tends to decrease hardenability. The alloys containing considerable amounts of free ferrite exhibited inferior high-temperature strength compared to those without free ferrite or with small amounts of free ferrite.

Need balanced composition

To obtain optimum creep strength for this class of steels, the chemical composition should be properly balanced to minimize the occurrence of delta ferrite or, preferably, to render these steels single phased at the austenitizing temperature. It is likely that optimum strength can be produced by adjusting the quantities of the various additions so that the composition represents the limiting edge of the gamma loop.

Since the boundary between the gamma and the gamma plus alpha fields shifts with temperature, the austenitizing temperature should be selected to lie in the austenite region and not in the austenite-ferrite region for the steel. The influence of alloying elements on hardenability and carbide formation will also affect creep resistance.

Although Heat S (1.0 pct Mo, 0.7 pct V) was stronger than the columbium-containing heats tested, these particular alloys were inferior in strength to the best available alloys of this class (Rex 448 and H 46). Alloy S does, however, compare favorably with the best columbium-free alloys which have been developed.

■ *Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept.,* THE IRON AGE, *Chestnut & 56th Sts., Philadelphia 39, Pa.*

Creep Tester Holds Constant Load Past Elastic Limit

◆ INCORPORATING worm-gear jacks into the design of two of its creep and stress-rupture testing machines, says Arcweld Manufacturing Co., Grove City, Pa., has stepped up efficiency and precision of the machines. At the same time, it has speeded up machine production.

Increased accuracy, Arcweld reports, stems from the fact that the Duff-Norton jacks provide a means for maintaining constant load on the metal specimen after it has been stressed beyond its elastic limit. Production advantages accrue because the jacks—being standard models—cost 50 pct less than it would cost if special parts were machined.

At the same time, the jacks permit applying a true axial load to test specimens.

By eliminating torsional strain—natural in most previous testing equipment but unatural so far as intended uses of the metals go—the improved machines eliminate the need for figuring "approximate torque" when analyzing test results. This simplifies testing and increases accuracy of the results.

Creep rupture testers are an old story. They've been used for more than 30 years to help determine behavior of precision alloy metals at high temperatures.

Today, even greater emphasis is being placed on their use in the search for improved alloys for jet engines, atomic reactors, and other applications where conditions of continuous high loading, in conjunction with high temperatures, exist.

Development of the improved testers was prompted by industry's growing need for an improved testing device. What was wanted was an equipment which would apply a true axial load, coupled with a loading system that would produce the travel motion necessary to stress the specimen and still maintain uniform load through constant ratio.

Eliminate torsional strain

Torsional strain was traced to slight radial movement in the loading mechanism. Pressure ratio decreased as the metal crept because the pulling force was being spread out through a longer area.

Arcweld felt the answer rested in the fulcrum point of the loading arm. It began work on a system for attaching the lower end of the specimen holder to a ball-bearing screw-type machine (jack). This would exert downward pressure on the previously stationary fulcrum. This force had to be induced without sudden movement or shock, however, which would snap the specimen or introduce fatigue and give inaccurate stress results.

The 10,000 or 20,000 lb capacity jacks chosen work as follows. On specimen yield or creep, the loaded arm holding the specimen drops. This triggers an electronic motion-sensing unit, in turn exciting a relay and starting the jack. Amount of elongation needed to activate the system is 0.00025 in.

When the loaded arm pulls the specimen beyond this point, pressure is maintained through downward force on the loading arm fulcrum.

WORM-GEAR jacks in creep test machines like this one both pull, support specimen through their elastic limit points. Result: better accuracy.

Assembly line inspection—

Photoelectric Cells Detect Spotweld Flaws Automatically

EARED disk and rim, later joined by spotwelding, are press-assembled here in equipment at rear.

◆ Production line inspection of spotwelds now is the responsibility of unwinking photoelectric cells . . . With their aid, production of high quality spotwelded assemblies progresses automatically at high speed.

◆ Switch from riveted to spotwelded parts justifies itself in lower fabrication costs . . . Defective spotwelds are caught by infrared-sensitive cells focused directly on the still smoking metal only a few inches away.

By HERBERT CHASE, Consultant, Forest Hills, N. Y.

◆ PHOTOELECTRIC testing of spotwelds proceeds automatically in assembly line weld fabrication of wheel rims. Resulting parts test twice as strong both in shear and pullout strengths as those of similar design joined through riveting.

In addition to a stronger and more serviceable design, production costs are down. A press operation for piercing the rivet holes no longer exists. Need for 12 rivets in each wheel assembly has vanished. Equipment and labor required for driving the rivets similarly is gone.

The wheel consists of a rim and a disk, both formerly joined by precisely toleranced rivets, driven cold. The process called for careful work.

Air leaks at the riveted joints were intolerable, since each passenger car wheel later mounts a tubeless tire.

Substitution of spotwelding for riveting banished the air leak problem at the Chevrolet gear and axle plant of General Motors Corp. in Detroit. Although specially built spotwelding equipment was found necessary, improvements in design and savings in production costs more than justify the changeover.

Wheel assembly starts with the 0.120 in. thick steel rim rolling down a track to the first station. There it meets a mating stamped disk of 0.130 in. thick steel supplied by a monorail conveyor hook. The disk is designed with four ears spaced 90° apart. Both parts are completely formed on reaching this point.

Operator aligns parts

At the assembly machine, the rim is laid in a shuttle. The disk is placed atop it by the operator, who aligns the parts correctly both with respect to each other and to the press.

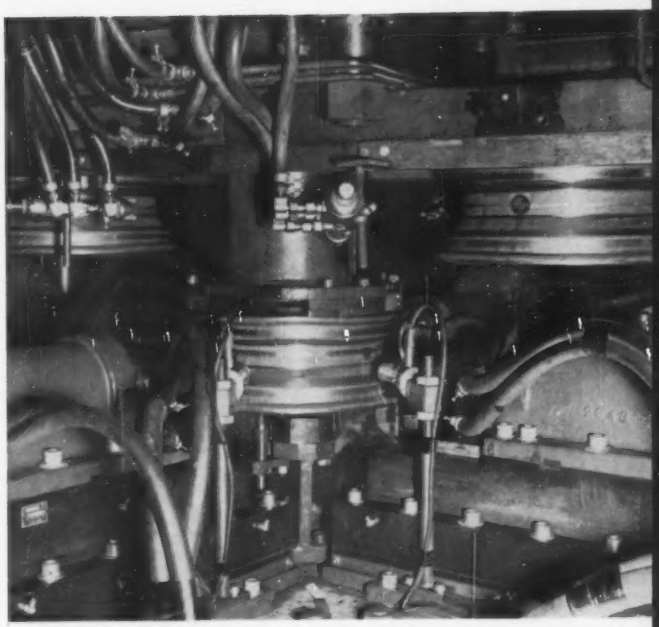
On pushing a button, the shuttle automatically feeds the two parts into a hydraulic press. In closing, this press forces the disk into the rim a specified distance. The plane of the disk is maintained at right angles to the spider disk axis.

As the press opens, the shuttle drops the assembly upon a track below. It then returns to load the next pair of parts. All motions are automatic.

On moving to the second station, a circular platform automatically elevates the rim and disk assembly into spotwelding position. Four Mallory electrodes spaced radially 90° apart advance automatically to make four simultaneous spotwelds, each near one edge of the four ears.

The electrodes retract, and the wheel lowers to the track again. It then indexes horizontally along the production track to a second spotweld station.

The wheel again lifts into welding position. Four electrodes at this station are alternately offset 12° right and left. The four final spotwelds are located on each ear, near the edge opposite that welded earlier.



INFRARED detectors respond to below-temperature spotwelds, trigger marking equipment.

A photoelectric cell sits near each gun at both welding stations. This cell is sensitive to infrared light. Focused on the individual spotweld, each cell responds to the heat energy emitted at that location. If the metal does not attain the temperature necessary for a sound and strong weld, the cell senses this and kicks in a guard circuit. This circuit activates automatic equipment that marks the defective weld in red or blue.

Punch pierces valve hole

On completion of the second set of spotwelds, the wheel lowers and indexes through two blank stations, and then into a Hannifin hydraulic press. There a punch advances to pierce a hole for the air valve through which the tire later will be inflated.

In the final station, the valve hole is chamfered. At the same time, a press produces four dimples into which the hub cap will fit when the wheel is assembled to the automobile. Wheels eject automatically and slide down a ramp to a conveyor.

Special alloy electrodes are used for spotwelding. Each is oblong in section with rounded ends. The inner set measures 7/16 x 11/16 in., and the outer 9/16 x 13/16 in. Each set receives current from its own Sciaky welder.

Weld areas approximate those of the smaller electrodes. Thus total area subjected to shear and other stresses in service is greater than the cumulative total of the sections of the 12¼-in. rivets used previously.

Catch Substandard Welds

Infrared sensitive photoelectric cells . . .

React to heated spotwelds.

Transmit weld temperatures to a guard circuit—

Which detects any substandard conditions . . .

And triggers equipment that marks weak weld areas.

Low-cost preheat—

Dual Frequencies Drop Induction Forging Costs

◆ Heat billets for forging, sure—but by furnace or induction methods? . . . Degree of flexibility required, floor space, type of operations are among factors to figure . . . They may—or may not—argue for induction.

◆ They did, for National Presto Industries' Eau Clair 105-mm shell plant . . . A dual-frequency arrangement prefaces 960-cycle coils with 60-cycle preheat to further improve efficiency . . . Six lines handle up to 480 shells each per hour.

SHAPED SHELLS emerge from forging. Press rates govern feeding of billets from induction lines.

COMPACT, dual-frequency setup combines economical, 60-cycle preheat with 960-cycle finish heat.

◆ DUAL-FREQUENCY induction heating is gaining ground in industry. Reasons aren't hard to find. Two-frequency setups improve on the already substantial strong points of induction heating at machine frequencies (960 to 10,000 cps) by teaming up lower-cost, 60-cycle power supply equipment with the higher frequency apparatus, to handle the pre-heating chore.

Net result is to produce substantial economies. These have led many companies to adopt the method for heat-treating, heating-for-forging and similar applications. Economies stem from two sources: Less investment (since there's less of the more expensive, high-frequency apparatus) and lower operating costs.

National Presto Industries adopted dual-frequency induction heating for its Eau Claire, Wis., 105-mm shell plant. Its experience pretty well sums up process advantages.

In this case equipment was needed for heating billets to proper forging temperature. The plant itself, of course, imposed certain basic limitations on what could be used. It was designed for completely mechanized operation, with steel being unloaded at one end and finished projectiles coming off the completely conveyorized lines at the other. Only inspection was not automated.

So—to begin with—the kind of billet heating equipment selected had to fit into this automated-plant framework.

Secondly, equipment had to be capable of handling the work load smoothly. For the sake of production flexibility and with an eye to size and cost of production equipment, the company had decided to manufacture in six lines, each with a production rate of 480 shells per hour. Total weight of steel to be heated was therefore in excess of 80,000 lb. per hour.

There were several good reasons arguing in favor of induction equipment over furnaces.

Low scale loss was one of these. With induction, the heating takes only a few minutes and the billet has no opportunity to scale. Against this negligible scale loss with induction, amount of material lost with open forging furnaces can add up to as high as 10 pct of the weight of the billet.

Ties in with automated setup

Eliminating scale would, at the same time, increase punch and die life on the presses.

Finally, induction equipment would tie in well with an automated setup, would require considerably less space than would furnaces, and would offer faster startups. Induction units could be brought on the line in a matter of a few minutes and be at full production rate fast. Furnaces, on the other hand, have extended warmup periods, making their operation more complicated on a one-shift basis.

Next problem was deciding the most economical number and size of units to do the job. The arrangement of six lines did not necessarily mean six billet heating machines would be needed—one machine might double up to feed two lines, for instance, or even two or more machines per line might be in order.

Figuring this one called for a careful analysis. This had to determine the effect of changing from six machines to more or less billet heaters on such factors as production flexibility, costs of equipment and installation, and synchronizing with press operation. Floor space requirements for billet machines and auxiliaries and maintenance factors also had to be weighed.

Two-in-one machines wanted

Several layouts were made. In the end, it was decided that a single billet machine per line was best. But to meet flexibility and space-limitation requirements, the company concluded it should really be two machines in one.

This called for a machine which could be arranged to operate at half capacity. At the same time—with space available amounting to about 30 x 10 ft—the machine could not be excessively long.

Machines to meet all these requirements were supplied by Westinghouse Electric Corp. Each heater is a dual line, in which duplicate sets of two 60 cycle coils for below Curie (around 1400°F) and two 960 cycle coils (for above Curie) heat two separate rows of billets as they are pushed through the coils. Maximum forge temperatures run about 2100°F.

Work feeds to the billet machine from a single belt-driven roller conveyor, that joins with conveying equipment from the descaling operation.

This carries the billet to a point midway between entrances to the two coil rows. If the machine's set up for full production, a hydraulically-operated pusher nudges the first billet into position in front of Coil Row #1. The second billet is pushed in front of Coil Row #2, and the pusher continues, delivering billets alternately to the two coil rows.

What Induction Heating Features

1. **Fast startup for one-shift operations**
2. **Fast billet heating, negligible scale loss**
3. **Longer punch and die life**
4. **Layout better adapted to automation**
5. **Accurate, automatic temperature control**

Thus both sides of the machine deliver billets alternately to the press. Either side can be operated alone, though, if one-half production is required or the other half of the machine is down for maintenance or coil change.

Another hydraulic cylinder takes over, once the billet has been placed in front of the coil. This advances the billet into the first coil, then retracts and waits for the next billet. When the second billet's in position, the pusher advances it into the coil on the heels of the first one, pushing that one ahead by one billet length.

Thus, with the machine full, each stroke advances the whole row of billets one length.

At the outfeed end of the coil rows, the billet is pushed to a conveyor in the center of the billet machine. This carries it directly to the press loading arm.

Infeed pusher stroke is regulated

Position of the billet as it leaves the coil row is important. If it's not all the way out of the coil, the pusher may cock it, causing mechanical damage to the coil. To prevent this, length of stroke of the infeed pusher is controlled from the outfeed. As the billet is advanced and leaves the coil it strikes a rocker arm connected to a limit switch. This stops the pushing cycle.

The press is of course synchronized with the billet machine, so that in production operation it controls the billet machine pushing cycle. As the press goes through its cycle it sends an impulse to the billet heater which actuates the machine to deliver a billet to the waiting press-loading arm.

Should trouble develop in the press so that it misses calling for a billet, the billet machine shuts down automatically.

The billet machine can also be operated on a straight time cycle, independent of the press. This is of course necessary during startups.

Operation of the machines is simple. The operator starts up by starting the 960-cycle motor generator set and its regulator. Then—from the control desk located at the machine—he initiates the automatic startup cycle. Billets then feed from the conveyor into both coils until all 60-cycle coils are filled.

Power is then automatically applied to these coils for a given time period. More billets then load, advancing the heated billets into the 960-cycle coils.

The operator applies a low voltage to these 960-cycle coils as the billets enter, so as not to exceed the current rating of the generator. As the coils fill and the power factor improves, he keeps raising voltage on the coils until full kw rating of the generator is applied.

Billets leaving the 960-cycle coils are scanned by a radiation pyrometer. If they are too low in temperature, a trap door below the billet automatically opens, dropping them into a reject chute to prevent a cold billet from being carried to the press. The billet machine is automatically shut down if billets emerging are over temperature.

RADIATION PYROMETERS (right and left center foreground) scan billets emerging from high-temperature coils for over-, under-heat.

Once on the line, the operator starts the press and switches the billet machine over so it is controlled by the press.

Power input to the billet heater, to meet the press production rate, is controlled by presetting the voltage-regulated 960-cycle motor generator equipment.

The tightness of the layout led to some head scratching as to how best to locate the necessary auxiliary equipment. Amount of current to be handled called for placing the source of power as close to the utilization point as was practical. Ideally, power centers and generators would have been set on the floor close to the billet machines.

Solution reached was to extend the width of a press pit, which had to be constructed for the transfer presses anyhow, so it extended under the billet machines as well. This was then walled off from the press pit proper and was used to house the 960-cycle motor generator sets and their controls, and the 60-cycle power-factor-correction capacitors. The 960-cycle capacitors were housed in the base of the billet machines.

Because of space limitations in the generator room, power centers were placed just outside the building.

Acme-Newport Steel

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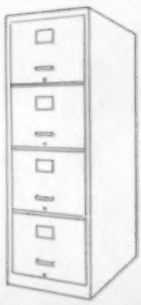

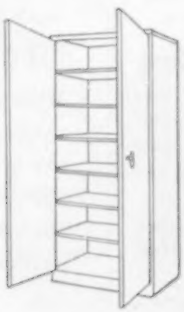

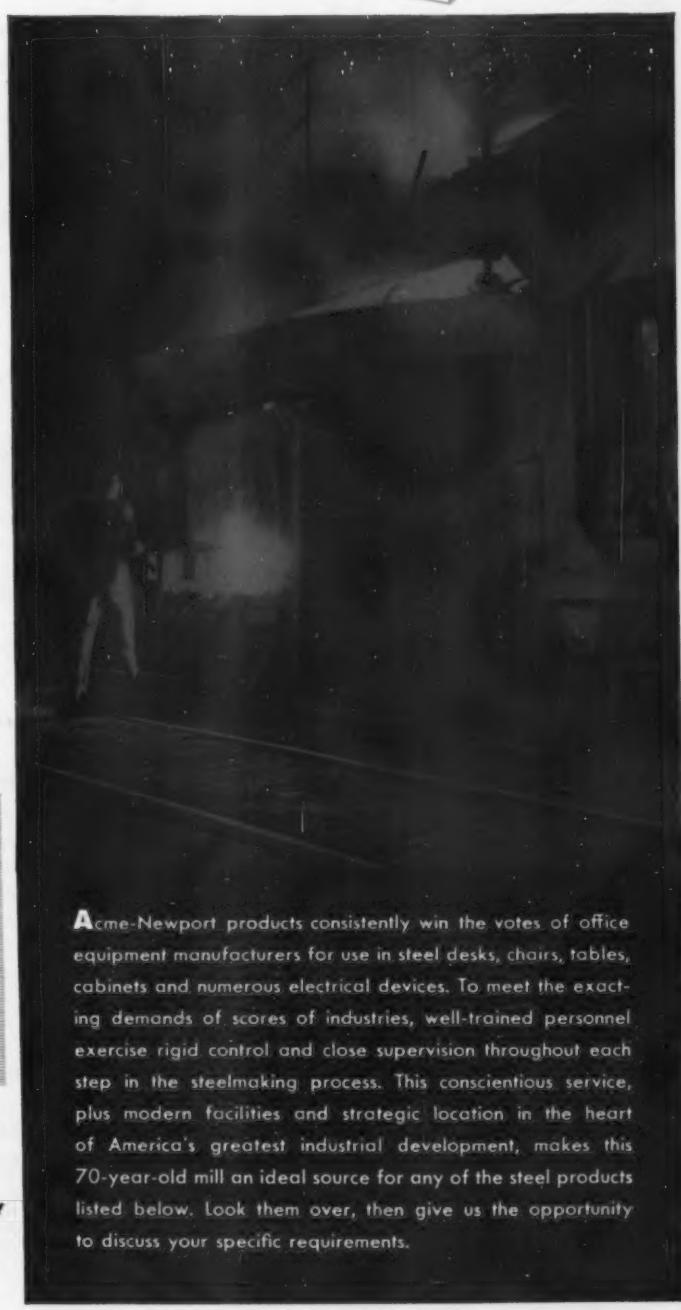

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It's the most versatile of all 6012 electrodes. Good wetting action of the Airco 387 electrode permits the use of high current and travel speed on both thick and thin sections. The fluxing action of the slag results in smooth, uniform deposits of superior appearance with minimum spatter. Especially recommended for single pass horizontal fillet welds because of ease of handling, good weld profile and ability to withstand high welding current.

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New Technical Literature:

Catalogs and Bulletins

Radiation pyrometers

Illustrated catalog describes one manufacturer's compensated radiation detector. Included is a new sapphire rod pyrometer. This has been developed primarily for controlling temperatures of molten germanium and silicon in seed crystal growing. Also covered is a high speed pyrometer with average speed of response of less than 0.5 second for 90 pct change in temperature. *Industrial Div., Minneapolis-Honeywell Regulator Co.*

For free copy circle No. 1 on postcard, p. 125

Friction materials

"Industrial Friction Materials" is the subject of an illustrated 16-page booklet. It covers asbestos brake blocks, linings and clutch facings. It describes moulded asbestos friction materials, woven materials and assembled sets for servicing popular industrial machines. *Johns-Manville.*

For free copy circle No. 2 on postcard, p. 125

Atmosphere cleaning

Super cleaning ordinary atmospheric air by means of specially adapted industrial cloth-filter-type dust collectors is treated in a new bulletin. Dealing with one firm's filtration process, bulletin has two case histories where this process is used for cleaning dust out of ordinary city or country air. *Wheelabrator Corp.*

For free copy circle No. 3 on postcard, p. 125

Electron microscopes

Engineering and application information for two electron microscopes is available in folder form. Forty-four typical uses for electron microscopes are tabulated along with operating data for two electron microscopes. *Instruments Div., North American Philips Co.*

For free copy circle No. 4 on postcard, p. 125

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 125.

Strip control

Strip thickness control systems get discussed in a new publication. This 12-page bulletin describes one company's systems used to measure and control strip thickness on tandem cold mills, reversing cold mills, for zinc and tin coating lines, for classifying and assorting lines, and for non-ferrous applications. *Industrial Nucleonics Corp.*

For free copy circle No. 5 on postcard, p. 125

Barrel-finishing

Barrel-finishing with abrasives is explained in a revised 76 page booklet. It includes information on types of barrels, selection of abrasive, cleaners, time cycles, and other facts about barrel-finishing. It includes before and after photographs and case histories of actual examples of deburring, finishing for plating, and precision forming of radii to blueprint specifications. *Norton Co.*

For free copy circle No. 6 on postcard, p. 125

Thread rolls, holders

A new bulletin features one manufacturer's standardized thread rolls and holders for single roll applications. Immediate delivery is possible from stock of rolls for popular thread sizes for both straight and taper pipe threads. They can be ordered by number, without drawings or specifications. *Reed Rolled Thread Die Co.*

For free copy circle No. 7 on postcard, p. 125

Sound testing

Principles and advantages of audio testing gears, singly or in clusters, is described in a bulletin now available. It also describes electronic audio sound testers developed by one manufacturer. These testers may be used directly in automated lines and eliminate the human element in accuracy of final sound testing. *Michigan Tool Co.*

For free copy circle No. 8 on postcard, p. 125

Air cylinders

Engineering features of one company's air cylinders are pointed out in a brochure. "It is the first threaded-head type cylinder offered with fully-interchangeable mounting brackets, made of non-corrosive materials throughout," it says. It is not a new product but one which has been accepted and tested over the past 10 years. *Modernair Corp.*

For free copy circle No. 9 on postcard, p. 125

Welding positioner

Precision engineered heavy duty welding positioners are explained in a new specifications sheet. It includes specifications, general description, and photographs. It is recommended for manual and automatic welding of cumbersome frames and bases, as well as for scarfing and beveling, and has a 24,000 lb. maximum capacity. *Worthington Corp.*

For free copy circle No. 10 on postcard, p. 125

Steel tubing

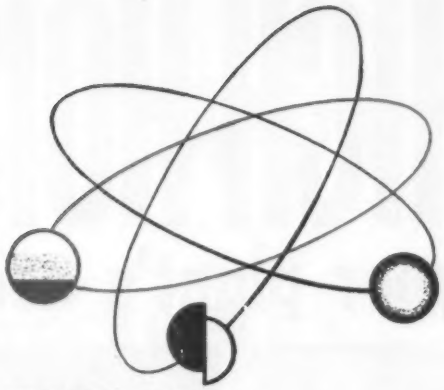
Fabricated steel tubing's ability to cut costs and increase production is explained in a new folder. Points covered are reduced overhead, less inventory, faster production, and special tubing materials. *Armco Steel Corp.*

For free copy circle No. 11 on postcard, p. 125

Glass-to-metal seals

"Steels for Glass To Metal Seals," is a four-page technical sheet. It gives information on surface and expansion requirements and other data on the five steels which are utilized for applications and designs of glass-to-metal seals. *Allegheny Ludlum Steel Corp.*

For free copy circle No. 12 on postcard, p. 125



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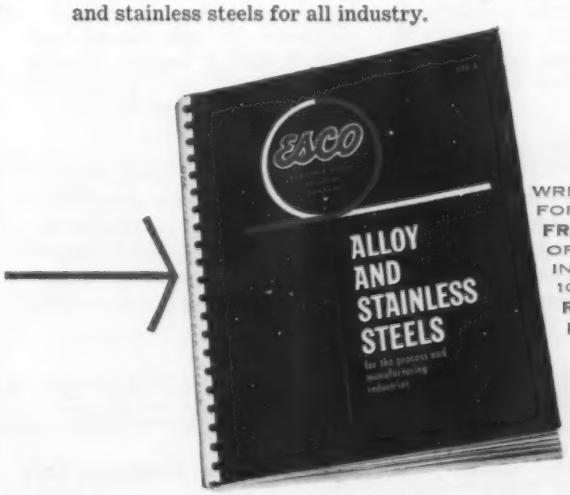

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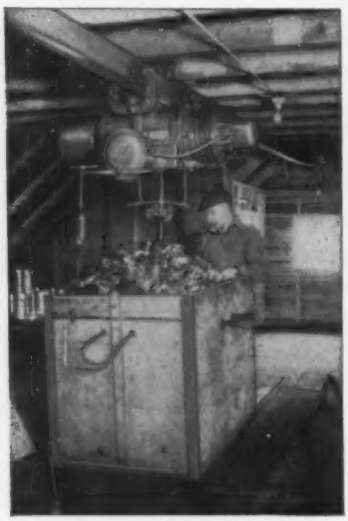

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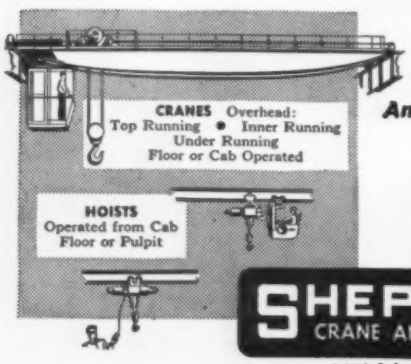

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FREE TECHNICAL LITERATURE

Heat treating

O. E. Cullen, Chief Metallurgist, Surface Combustion Corp. discusses basic principles of quality gas carburizing in a company publication. Simplicity and accuracy of process are graphically illustrated. Other articles are contained on annealing and age hardening of copper alloy coils, low cost dew point control and television controlled slab furnaces. *Surface Combustion Corp.*

For free copy circle No. 13 on postcard, p. 125

Crane safety

Big cranes can now be equipped with a counter torque safety hook block. So says a ten-page brochure. This block prevents the breaking of the hoisting ropes, and injury to the trolley frame when the hook block is run up. Two complete pages explain features of a typical safety hook block and its componets. A numbered engineering drawing and component list explain its general makeup, construction and installation. *The Alliance Machine Co.*

For free copy circle No. 14 on postcard, p. 125

DC motors

Direct-current motors, ½ through 200 hp, and motor-generator sets up through 200-kw output are described in a new bulletin. It covers shunt and stabilized shunt wound, compound wound and series wound motors in eight different enclosures plus a matching line of motor-generator sets for reliable conversion of ac to dc current. *Allis-Chalmers Mfg. Co.*

For free copy circle No. 15 on postcard, p. 125

Welding rods

High-strength manganese bronze filler rods of uniformly high quality for oxy-acetylene welding are described in a new bulletin. It is said to be a good, low cost, all-purpose, general maintenance filler rod for brazing dissimilar metals; braze-welding heavy cast iron and steel castings; repair of gear teeth, etc; and for building up wear-and corrosion-resistant parts. *Ampco Metal, Inc.*

For free copy circle No. 16 on postcard, p. 125

The theme of the 1957 IRON AGE Annual Issue

JANUARY 3

Metalworking's Growing Markets

MORE THAN 100 FACT-FILLED PAGES will be devoted to this urgent subject

COVERED IN DETAIL will be . . .

the 1957 Market — *forecast of markets for all leading metals*

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The **IRON AGE**

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MONEY-SAVING MAGIC IN THIS "HEEL AND TOE"

This Tinnerman fastener is modeled after your foot . . . there's a heel and toe . . . it slides easily into the holes punched in the metal, fiber, or plastic, even as your foot slides into a shoe. But it is much easier to put on than to take off!

The primary function of this SPEED NUT fastening principle is to provide a fast, easy-to-apply, low-cost, self-retaining fastener. Its snap-on attachment feature requires little skill and no welding or staking. Yet it assures positive retention for center panel or blind locations.

Tinnerman "heel-and-toe" fasteners can also have a wide variety of fastening features. The self-retaining heel-and-toe can be combined with the famous Tinnerman SPEED NUT impression. Or with a speedy cable clip . . . or a spring catch . . . a molding clip . . . a wire retainer . . . almost any fastening idea you require.

Tinnerman sales engineers are ready to make a SPEED NUT Analysis of your fastening requirements. Or you can write to us for details and engineering data. *Tinnerman Products, Inc., Box 6688, Dept. 12, Cleveland 1, Ohio.*

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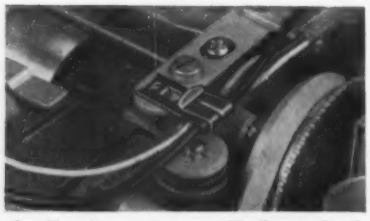
FASTEST THING IN FASTENINGS®



On dictating equipment, this SPEED CLIP® holds wires safely away from moving parts.

SPEED CLIPS secure molding on plastic sign, help manufacturer gain 48% assembly saving.

Assembly of TV tuning coil to chassis and servicing simplified with special SPEED CLIP.

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 120.

Quality control

Continuous, noncontacting radiation gages for virtually any continuous strip produced material are reviewed in a dozen page booklet. Advantages of non-contacting gages are listed, including: accuracy in millionths of an inch, production at high speeds, no marring of high finishes, gaging of extremely thin materials (i.e.: metal foil) and soft materials (i.e.: plastics, rubber) is possible. Two types of non-contacting gages are available. *Pratt & Whitney.*

For free copy circle No. 17 on postcard

Pipe joining

Welding joints with a new specially shaped material is easy, according to a 10-page booklet. Faster pipe joining accomplished by welding on one side only is described and illustrated in the brochure. Smooth, uniform welds inside and out are promised with the process. Illustrations show how, in seven steps, how the weld ring joins pipe. Specifications lists tell what size insert to use with various pipe. *Arcos Corp.*

For free copy circle No. 18 on postcard

Socket screws

Complete socket screw line available from one company is described in literature now available. It illustrates and describes socket head cap screws made of heat-treated alloy steel, or 18-8 stainless steel, in micro sizes from #0 to #3, catalog sizes from #4 to 1½ in. Socket sets are available up to 1 in. Flat head socket head cap screws are in standard sizes from #4 to ¾ in. Button head socket screws are described. *Cleveland Cap Screw Co.*

For free copy circle No. 19 on postcard

Educational foundation

Development of the industrial leaders of tomorrow is discussed in a new booklet. It explains the growth and development of a scholarship program, and other related services, designed to promote interest in cast metals study in the students of today and tomorrow. This illustrated booklet tells what contributing members have done, and can do, through a particular foundation, for the benefit of their own growth and development. *Foundry Educational Foundation.*

For free copy circle No. 20 on postcard

Battery charger

Latest features of four-circuit automatic battery chargers are given in a four-page bulletin. A new type battery line contactor is illustrated. It is described as having contacts renewable in the field, results in longer contactor life plus reduced maintenance. This enables it to remain constantly ready, according to the manufacturer. *The Electric Products Co.*

For free copy circle No. 21 on postcard

Travelling grate stoker

New catalog describes operation and advantages of a modified travelling grate type stoker that compensates for loss of volume in the fuel bed as the combustibles are burned out, maintaining even depth of the fuel bed from front to rear and side to side. It describes a variety of installations, and lists a typical heat balance table. A useful tabulation shows dimensions of standard stokers that will meet a wide variety of effective grate area requirements. *The Johnston & Jennings Co.*

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Wheel dressing

Wheel dressing with diamond tools is improved by a new tool, according to a data sheet now available. A mere flick of the wrist turns the diamond, it states. Other advantages listed include: (1) Frequent turning is encouraged without removing or readjusting the diamond tool, (2) fewer resets and fewer dresses are needed, (3) diamond life and wheel life are lengthened, (4) much smaller diamonds suffice, cutting costs, (5) diamonds stay sharp longer, and (6) rigid holding prevents vibration. Shank diameters of ¼, ⅜, and 7/16 in. are offered. *Cleveland Industrial Tool Co., Inc.*

For free copy circle No. 23 on postcard

Split roller bearings

Split roller bearings' description and advantages are illustrated in a new 22-page booklet. It lists many industries in which these bearings are used. Construction features, such as the fact that they are made in halves throughout, are covered. Their races and rollers are made of high carbon-chrome alloy steel, through-hardened to yield load-carrying capacity and strength, and are accurately ground to a high finish, it says. Advantages listed include: easy starting, power saving, reduction in lubricant costs, design compactness, long life, etc. *Cooper Split Roller Bearing Corp.*

For free copy circle No. 24 on postcard

Welding cable

Welding cable facts and figures are given fast review in a new four-page brochure. A unique introduction explains how in its first year of use, a particular welding cable was so popular that the total amount sold would stretch between Baltimore and New York City (191 miles). Then it becomes somewhat more serious giving the product's advantages (i.e.; extreme lightness, dollar savings, pre-cut packaged 50 and 100-ft lengths). Cable is aluminum, weighs only half as much as same size copper cable, is extremely flexible. *Tweco Products, Inc.*

For free copy circle No. 25 on postcard

Tungsten electrodes

Literature on tungsten electrodes and inert gas welding techniques includes a welding guide and a listing of money-saving tips. The inert gas arc welding guide is suitable for hanging on the shop wall. It has been prepared to assist the user in manual welding by the inert gas arc method. It consists of three charts, each devoted to a specific metal: aluminum, stainless steel or magnesium. The money saving tips are contained in a separate sheet. These are designed to help the welder use the right rod on the right job in the most satisfactory way. These tips are based on field surveys and investigations by the research engineering staffs of Rensselaer Polytechnic Institute and the company. *Sylvania Electric Products Inc.*

For free copy circle No. 26 on postcard

Emergency repairs

"When Disaster Strikes," is a new 12-page publication that tells how one large company's apparatus service shops can help speed plant recovery following emergencies. The new disaster bulletin describes procedures for recovery of vital electrical equipment damaged by flood, fire, water, wind, and other natural forces. Suggestions serve as a guide in helping industries and utilities resume production quickly, prior to contacting the service shop for assistance. Typical Topics include: "Basic electrical steps toward restoring production" and "Recommended procedure for reclamation of high-priority electrical equipment." A directory lists 52 strategically located service shops. *General Electric Co.*

For free copy circle No. 27 on postcard

Thrust bearings

An improved and expanded line of crane-hook thrust bearings is announced in a four-page bulletin. Bearing sizes are now available for crane hooks ranging in capacity from 5 ton with 1⅝-in. shank diameter, to 250 ton with 10-in. shank. New design features include crowned roller bearings. *Rollway Bearing Co.*

For free copy circle No. 28 on postcard

The Engineer from Continental Screw Co. ...

...makes Phillips "Bits-Holders-Screws" for you—another exclusive from Continental

This 3-way fastening combination makes power-driving practical

Manufacturers have cut fastening costs up to 50% by switching to Continental's Phillips "Bits-Holders-Screws." This 3-way fastening combination, exclusive with Continental, makes power driving really practical—even on your finished parts.

Did you know, for example, that just one size Phillips Driver will drive 85% of all Phillips Screws used in industry? And just four sizes of Phillips Drivers will fit the entire range of screw sizes?

Remember, no other company makes Phillips "Bits-Holders-Screws." And Continental offers you a complete selection of other Phillips fasteners, too. Talk to the engineers at Continental about the money you can save with power driving. Call them today.

Free Booklet: Continental Screw Co. offers you a free booklet on Hy-Pro Phillips Insert Bits and Holders. Just send your name and address to Continental Screw Co., New Bedford, Mass.

Only Continental Makes

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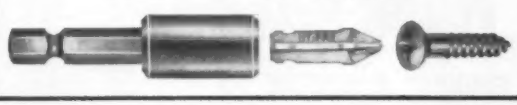

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GREY IRON CASTINGS

HANDLING: Boxed Ingots

Dumping ingots on boxcar and truck floors consumes time . . . "Ingot-by-ingot" unloading wastes more . . . Boxing them like oranges cuts costs, pleases customers.

One company's problems in storing, handling, shipping and segregating ingots are largely solved by packaging. By a method of boxing ingots like oranges, the firm has reduced their handling costs and practically eliminated those of customers.

Nonferrous ingots are stored and shipped in wirebound pallet bins at W. J. Bullock, Inc., Birmingham, Ala. These weigh only 40-lb each but often are packed with more than a ton of ingots and high-stacked in storage. Also, bins used to ship ingots in their own or their customers' trucks usually are returned for reuse. Some have made four trips and still are in service.

Ingots drop into bin, are reloaded into box (foreground.)

Old Method Consumed Time

Before adopting packaging, ingots were stored in steel pallet tote boxes or on pallets until ready for shipment. Then they were dumped on the floors of trucks or cars. At destination, they had to be unloaded by hand, often ingot by ingot tossed to the ground, and then palletized to be taken to storage. This operation consumed considerable man-time.

With packaging, ingots coming direct from the smelter are dumped by conveyor into heavy bins after being cooled in a water bath. Wirebound pallet bins are placed beside the heavy bin into which the conveyor dumps the ingots. They are place-packed directly into the shipping containers, 88 25-lb ingots (2200 lb) to the bin.

Usually Shipped Lidless

When shipped by private carrier, wirebound bins usually are without lids. Nailed-on lids are attached to prevent pilferage and inadvertent mixing when shipped by common carrier.

The inspiration for packaging ingots came from wirebound pallet bins shipped to Bullock by their suppliers. These weigh only 125-lb each. However they are packed with well over a ton of metallurgical alloys. Previously, alloys had been received in bulk and were dumped in piles to be handled by shovel and wheelbarrow. Now, fork-lift trucks easily handle the alloy-packed wirebound pallet

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 125. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

bins. Hence, just the right amounts are poured from them as needed.

Customers "Agreeably Surprised"

"Our customers, long accustomed to receiving ingots loose, were agreeably surprised by our

Packed with 2200 lb each, bins assure even weight distribution.

adoption of the wirebound pallet bins," says W. E. Bullock, company president.

Place-packing ingots according to predetermined patterns also deters pilferage, since a missing ingot is instantly detected.

Extrusion:

Press extrudes 50-ft of six-in. tube in nine seconds.

The much heralded U. S. Air Force heavy press program has put into full operation its new 12,000-ton capacity press for the extrusion of steels and large titanium components.

Operated by the Metals Processing Div. of Curtiss-Wright in Buffalo, the giant horizontal extrusion press has a squeezing power of 12,000 tons. The 126-ft long hydraulic press was designed, built and installed by Loewy-Hydropress Div. of Baldwin-Lima-Hamilton, also builders of a huge forging press for the Air Force.

Produces Rod At High Speed

The speed and power of the press are demonstrated by the fact that a 50-ft long tube, six inches

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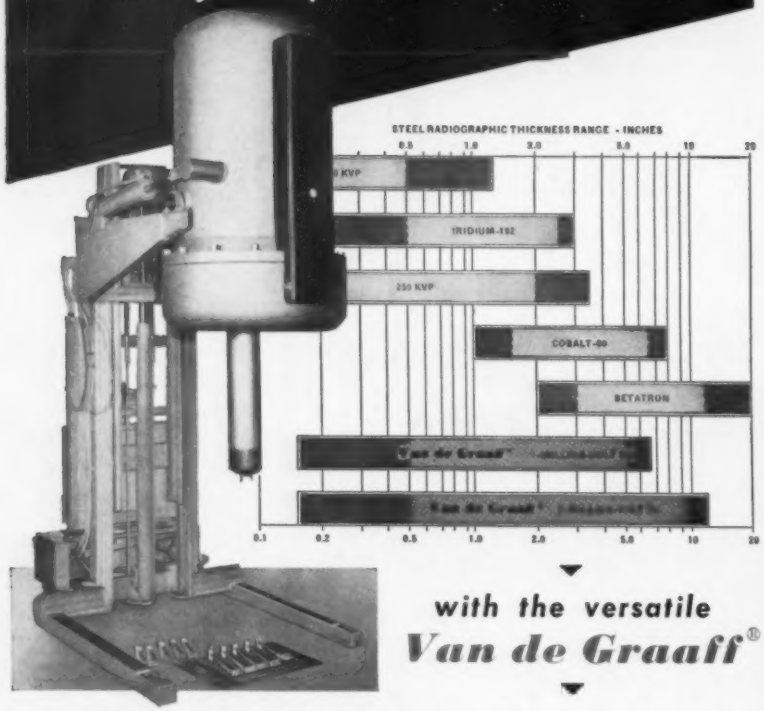

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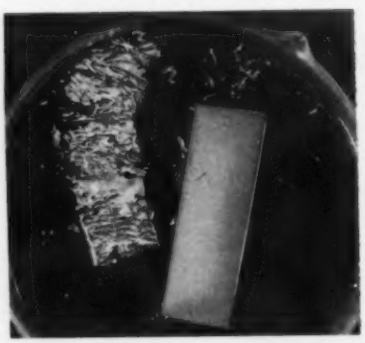
HIGH VOLTAGE ENGINEERING CORPORATION
7 UNIVERSITY ROAD CAMBRIDGE 38, MASSACHUSETTS

in diameter, is extruded in nine seconds. One thousand ft of ½-in. spring steel rod is extruded in three seconds. Through its controlled range of speeds and pressures, critical aircraft components made of titanium, and stainless steel sections are now being produced.

Finishing:

Rhodium plate won't curl, crack or peel.

Curling, cracking and peeling common in conventional rhodium electroplate is eliminated by a new process. The method produces compressively stressed deposits. It is expected to aid manufacturers who have long been plagued with rejects of rhodium plated components due to this metal's high tensile stress characteristics.



Conventional rhodium plate (left) failed in test.

Extensive tests and experiments of the process have been made by the developer, Sel-Rex Precious Metals, Inc., Belleville, N. J. One of these entailed dissolving the basis metal from an object plated with conventional rhodium. In this instance, the rhodium disintegrated into small crystalline flakes. The edges curled away from the basis metal, demonstrating its inherent high tensile stress.

Under Compressive Stress

An object plated with compressively stressed rhodium was subjected to the same test. It is reported that a continous electroplated film remained. The edges

curled toward the basis metal, indicating that the deposit was under compressive stress.

In addition to the process' obvious advantages, the company says compressively stressed rhodium will materially increase the fatigue resistance of the metal over which it is deposited.

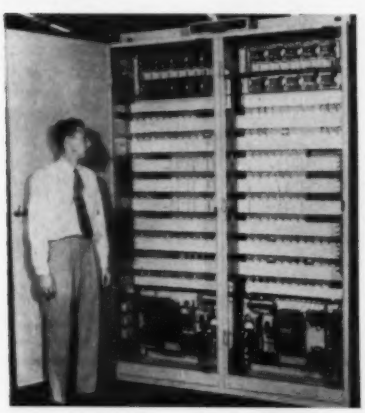
Controls:

Static switching controls replacing relay systems?

A new static switching control system accomplishes control functions historically performed by contact making devices, such as relays. It is designed to aid in automation of various low-power switching operations.

Provides Five Basic Functions

The system makes available a complete line of static components to provide the five logic functions basic to intelligence switching. These are the and, or, not, memory, and time-delay functions. The logic units provide a new tool for performing steel mill processing or individual machine control, according to General Electric spokesmen who engineered the system.



Completely engineered panel can tackle complex controls.

The static switching control can be furnished in component form for use by control designers or in completely engineered panels and systems. Its design permits it to be combined with available regu-

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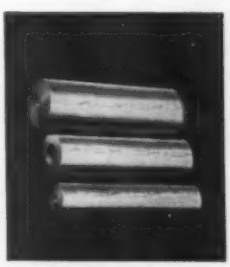

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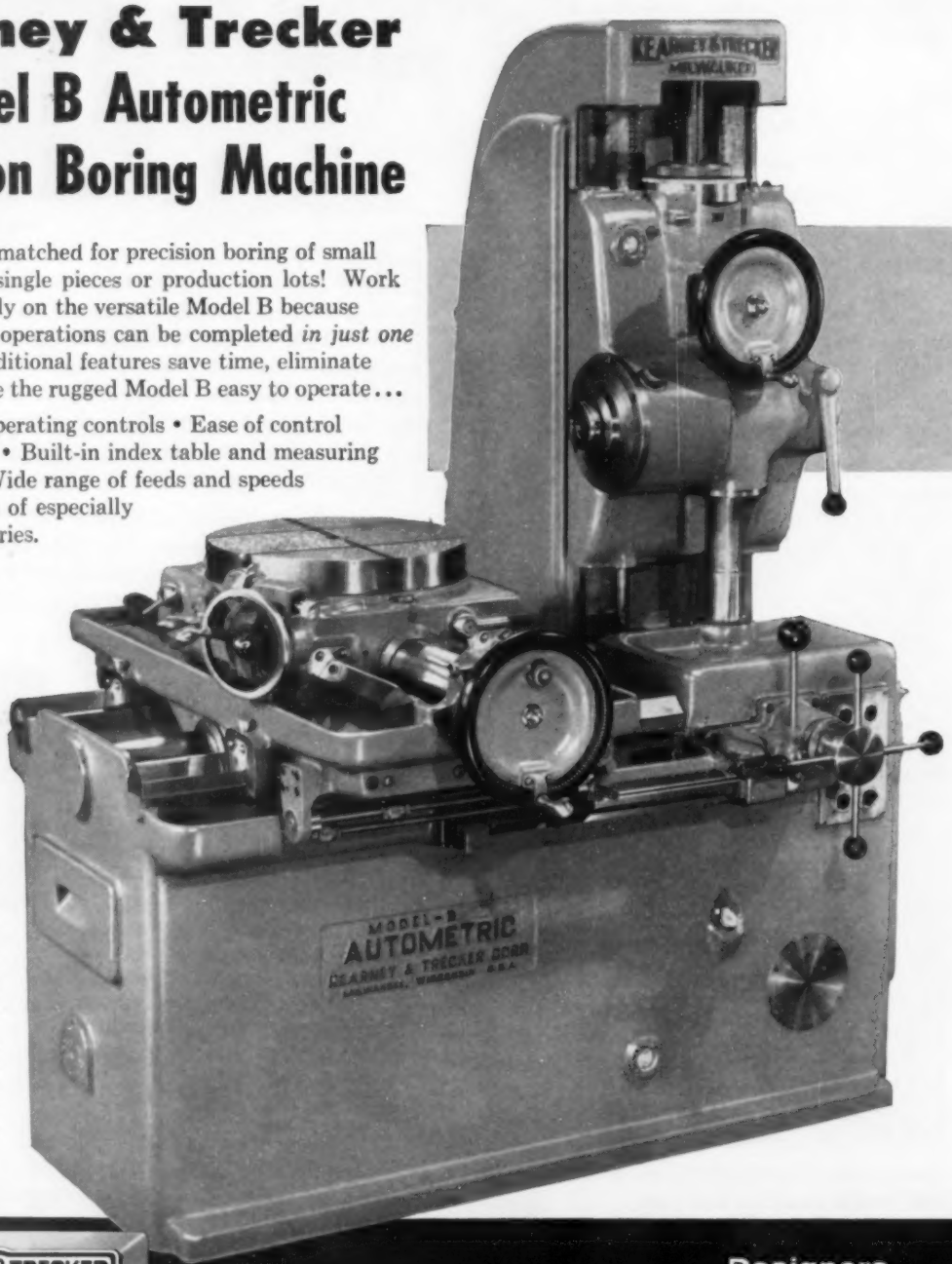

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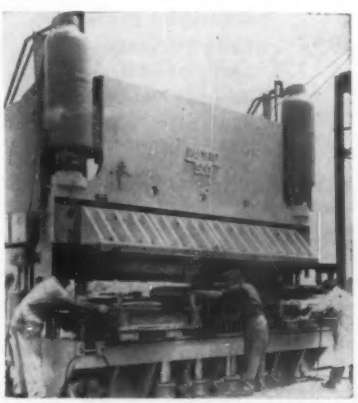
Forming:

Press brake draws, trims and flanges simultaneously.

A hydraulic press brake, with its entire bed area workable, forms finished refrigerator doors at Kelvinator's Mexico City plant every 30 seconds. It draws, trims four sides and flanges edges simultaneously.

Ram Remains Level

The ram remains level and applies equal pressure throughout its entire length, regardless of load distribution. Thus, any number of progressive dies up to the capacity of the bed are worked simultaneously. Dies are a combination of blanking, stamping, deep drawing, embossing, punching or forming.



This hydraulic press brake forms finished refrigerator doors.

The press operates manually or on automatic cycle. Its manufacturer is the Pacific Industrial Mfg. Co., Oakland, Calif.

New Books:

"National Standards In A National Economy" is authored by 34 experts. They link standards with the achievements of scientific research and technological innovation and high production efficiency in the age of automation. Its editor is the late Dickson Reck, professor, School of Business Administration, U. of Cal. It introduces and discusses the movement toward international standards, their freeing of private initiative and production and some implications. It is certainly must reading for those directly concerned with standards; interesting, too, for those that aren't. 370 pp. $5.00 per copy. Harper & Bros., 49 E. 33rd St., New York 16.

"Metallizing Bibliography" contains 181 articles which have been published on metallizing since 1913, each with annotation describing the contents. The items are grouped together under the headings: equipment, processes, applications, testing, theory, costs and miscellaneous. It is intended to serve as a reference to anyone interested in any phase of metallizing. The 68 publications in which these articles appeared are listed with their addresses so that copies of articles which are of interest may be obtained. $1.50 per copy. American Welding Society, 33 W. 39th Street, N. Y. 18.

"Engineering Inspection Manual," by Henry A. Roy should be an aid to those engaged in machine tool and other mechanical inspection. Its author has been inspector (and chief inspector) of several leading machinery manufacturing firms. Packed with informative and educational text, it is nevertheless well illustrated. The author attempts to facilitate the work, better the understanding and pave the way for advancement of inspector-readers. It tackles every phase of inspection intelligently, avoiding unnecessary details, but emphasizes all the procedures which contribute to quality control. 160 pp. Many illustrations and tables. $5.75 per copy. Chemical Publishing Co., Inc., 212 Fifth Ave., New York 10.

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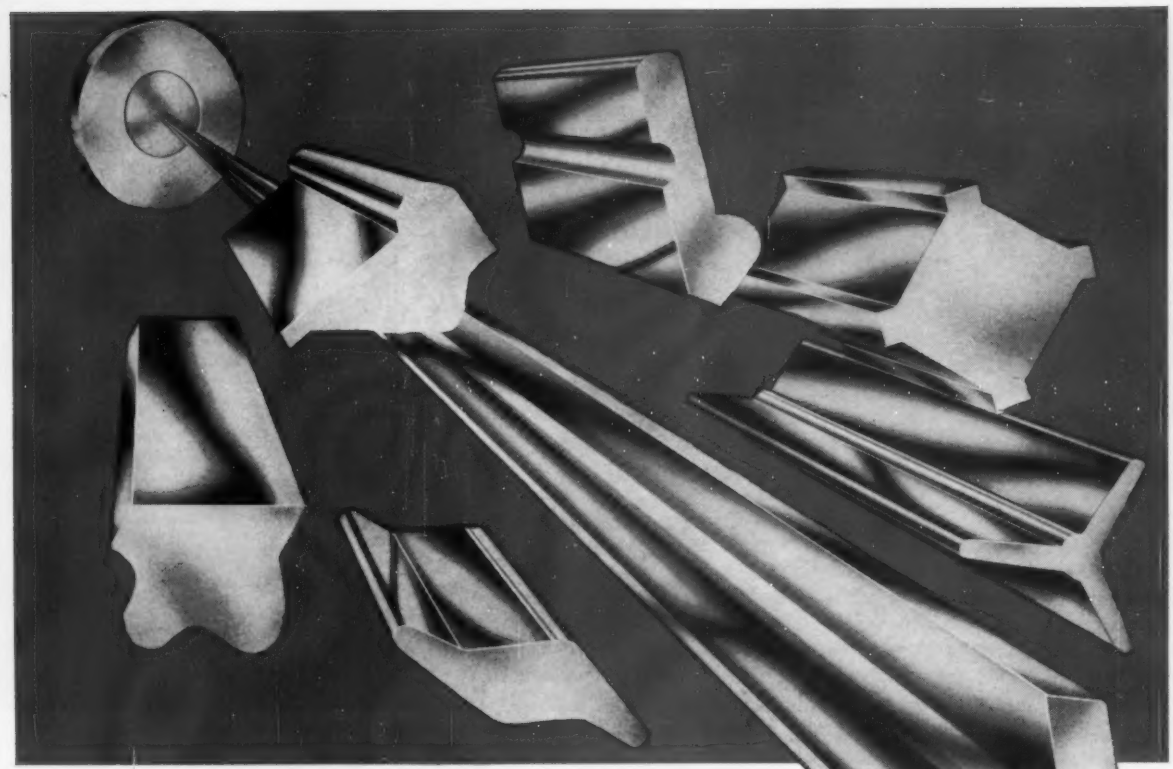
"Machine Trades Blueprint Reading," by Ihne and Streeter (third edition) devotes the first 65 pages to six chapters which provide a comprehensive discussion of basic principles of blueprint reading. A student might acquire, without recourse to supplementary lectures or textbooks, development of actual reading skill. This data is always at hand, should he later find it necessary to review basic principles when dealing with concrete reading problems. Particular emphasis has been given to visualization. Although the function of the draftsman is to visualize objects and then to represent them by drawings, the procedure in reading blueprints is actually the reverse: objects must be visualized by the reader from the finished prints. 172 pp. Many actual blueprints and drawings. $2.95 per copy. American Technical Society, 848 E. 58th St., Chicago 37, Ill.

"The Condensed Chemical Dictionary" is as complete as it could be without being burdensome. It is handy, and lists virtually any chemical (and many metallurgical) terms. It contains 30,000 entries and is the fifth edition of the book. It is up-to-date (i.e.: latest tradenames). Adjectives like vast coverage, etc. are usually applied to a book such as this. However, it can be summed up as practical, complete as possible and handy. 1220 pp, thumb indexed. $12.50 per copy. Reinhold Publishing Corp., 430 Park Ave., New York 22.

"ASTM Standards on Copper and Copper Alloys" contains data on all ASTM standards pertaining to copper and copper alloys. These include in their latest form 127 ASTM Standards, 110 specifications, 12 test methods, 2 recommended practices, 2 classifications (of coppers and copper-base alloys), and 1 definition of terms. Standards cover copper, copper-alloy, and copper-covered-steel electrical conductors; copper and copper-alloy plate, sheet, strip, and rolled bar; copper and copper-alloy rod, bar, and shapes, and die forgings; copper and copper-alloy wire; copper and copper-alloy pipe and



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tube; copper-alloy ingot; copper-alloy castings; copper and copper-alloy filler metal; and methods of test for copper and copper-alloys. 654 pp. $5.75 per copy. ASTM, 1916 Race St., Phila. 3, Pa.

The American Society of Mechanical Engineers has announced publication of American Standard Hexagon Head Cap Screws, Slotted Head Cap Screws, Square Head Set Screws, and Slotted Headless Set Screws, ASA B18.6.2-1956. Copies may be obtained from ASME at 29 West 39th Street, New York 18, at $1.50 per copy.

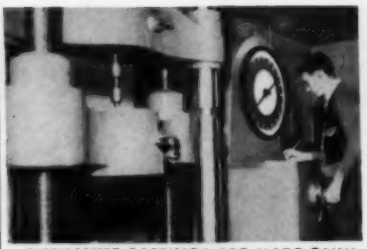
"1952-1953 Bibliographic Survey of Corrosion," compiled by A. Irene Humphrey. Summaries of 3344 corrosion and corrosion prevention articles, books and brochures published in 1952-1953 are compiled in this volume. Material was selected from bulletins published by more than thirty abstracting agencies representing international literature coverage. 382 pp. $10.00 per copy. National Assn. of Corrosion Engineers, 1061 M & M Bldg., Houston 2, Tex.

"Developing Effective Supervisory Newsletters," by Robert Newcomb and Marg Sammons, explains how these newsletters strengthen communications within the company. It states that with the active interest and support of higher management, the supervisory newsletter can play a vital part in making the supervisor a member of management—in fact as well as in name. It presents basic principles and practical suggestions which cover all phases of newsletter development: initial planning, getting supervisory participation, preparing copy, devising a format, production, distribution, and evaluation. 90 pp. $3.75 per copy. (AMA members $2.50). American Management Assn., 1515 Broadway, New York 36.

"Management In Action," by Lawrence A. Appley, is a "how-to-do-it" book. The emphasis is on how to manage. As president of the American Management Association, Appley is certainly in a position to comment on management methods and manners. He uses his experience and contacts with experts to arrive at useful insights concerning the character and spirit of an organization, leadership, communication, and, broadly, the tools and techniques of management. Each section provides practical reader suggestions. Authority, management responsibility, employee morale, executive appraisal, and related matters are dragged over the coals. Essentially it is a catechism for management. 382 pp. $5.00 per copy (AMA members $3.50). American Management Assn., 1515 Broadway, New York 36.

"Corrosion Resistance of Phosphated Steel After Heating Under Oil," by J. Doss, Rock Island Arsenal Laboratory, tells how accelerated corrosion tests were performed on zinc and manganese phosphate coatings on steel. This was done to determine the effect of elevated temperatures in the absence of air on the corrosion resistance of the coatings. The coatings were heated under oil at 25° intervals in the range of 175° through 450°F. Zinc phosphate coatings began to lose corrosion resistance at a temperature between 300° and 325°, manganese phosphate coatings between 400° and 425°. 14 pp. 50 cents per copy. Order PB 111915. Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C.

"Industrial Engineering Handbook," by Harold B. Maynard, is a broad, authoritative treatment of the whole field of industrial engineering. Principles, data, methods, and procedures are covered. Scores of experts, working under the editorship of one of the most distinguished leaders in the field, have each contributed a measure of their experience on such diverse topics as the industrial engineering function, work measurement, predetermined elemental time standards, wage payments, plant facilities and design, and control procedures. 1504 pp. 648 illustrations. $17.50 per copy. McGraw-Hill Book Co., 327 W. 41st St., New York 36.



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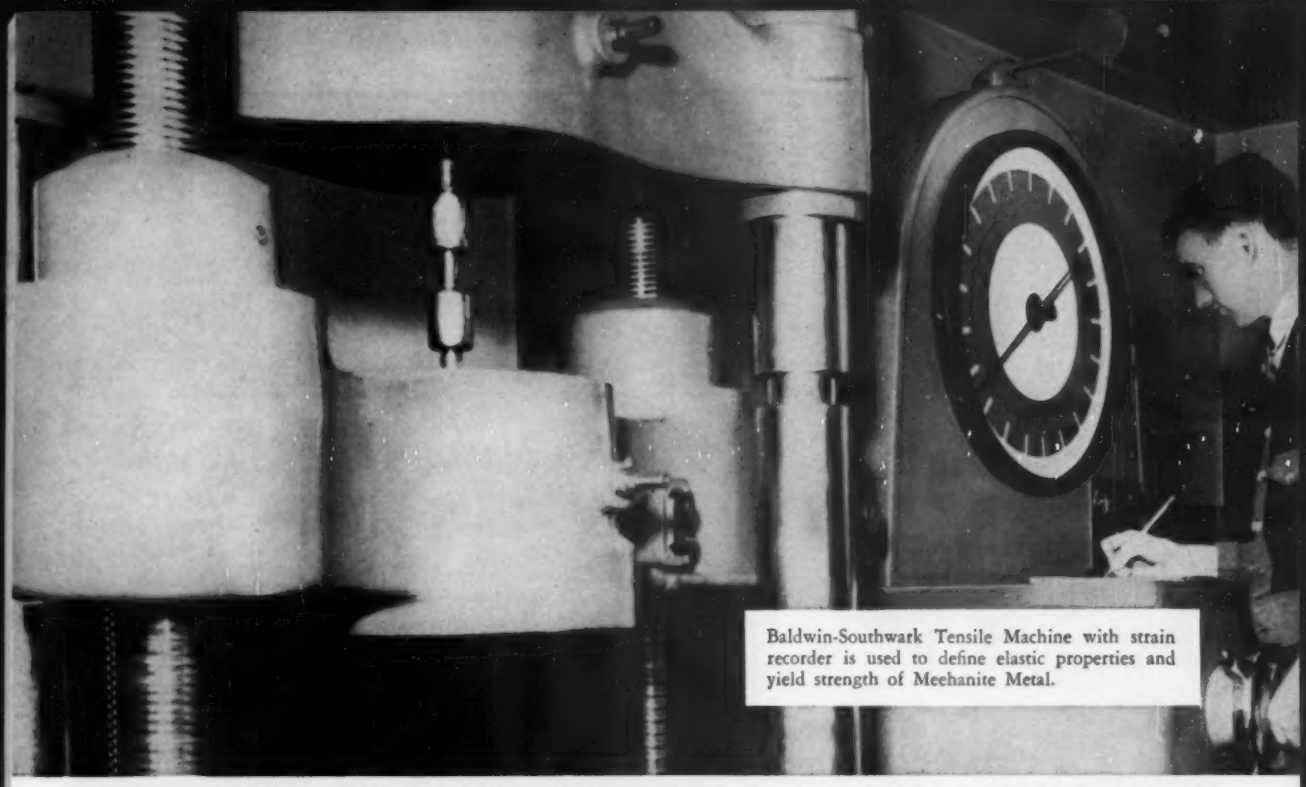

Baldwin-Southwark Tensile Machine with strain recorder is used to define elastic properties and yield strength of Meehanite Metal.

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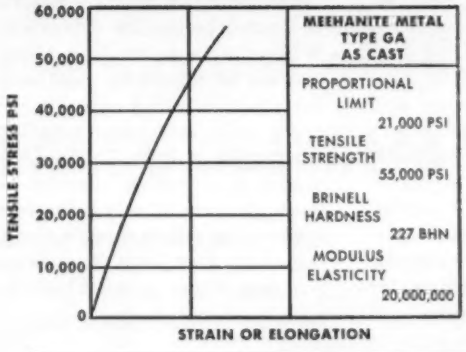
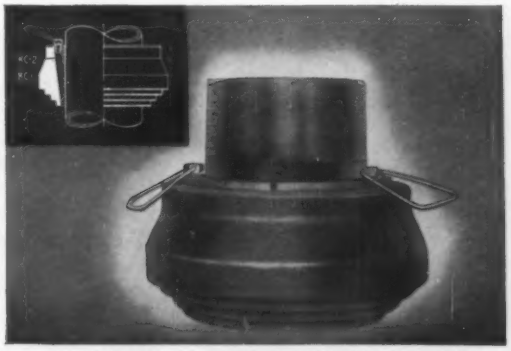


Meehanite Metal has a controlled microstructure, consisting of uniformly distributed graphite in a fully pearlitic matrix, which is comparable to that of a normalized spring or tool steel. This structure, the result of a unique manufacturing process based upon proven metallurgical techniques, assures good tensile properties in association with high yield strength and elastic modulus. These properties are of paramount importance in the selection of engineering materials since they aid in defining the useful characteristics of Meehanite Metal in service.

For information, write today for Bulletin 43—Meehanite Castings for Pressure Tightness.

Power-Twin hydraulic pullers of 17½, 30 and 50 ton capacities manufactured with Meehanite ram body castings tested to 24,000 psi. The 30-ton unit needed an applied load of 87 tons before failure.



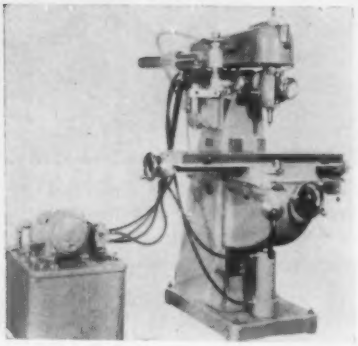
Meehanite casting support (KC-1) to hold tapered slips (KC-2) is subjected to downward pressures of up to 150,000 lbs. in oil well drilling. No evidence of failure under loads up to 210,000 lbs.

MEEHANITE METAL®

MEEHANITE METAL CORPORATION • NEW ROCHELLE • NEW YORK

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 125 or 126.



Miller line may now be equipped with tracer

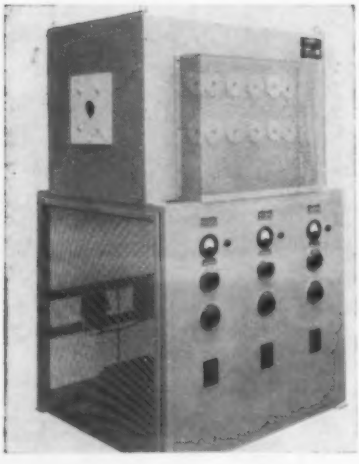
One company's line of vertical milling machines may now be equipped with a tracer attachment for automatic control. The millers are available with a follower jack screw type, knee hydraulic attachment. This promises more accurate work than raising and lowering the quill during machining operations. The tracer system controls the vertical rise and fall of the table. It is actuated by a hydraulic cylinder mounted in place of the present vertical screw. Cylinder movement is governed by the tracer valve, working from a model or template located on the machine table. The stylus which governs the table's vertical movement is set in the same plane as the milling machine spindle. Under normal conditions cut depth tolerance can be held to ±0.001-in. *U. S. Burke.*

For more data circle No. 29 on postcard, p. 125

Lift truck has forks that rotate 360°

Rotating (360°) forks now enable electric fork truck operators to pick up a box and rotate it in either direction or dump it. The new attachment is equipped with round 2½-in. diam forks with a lowered height of 3¼-in. to permit the normal handling of pallets or skid boxes. The rotation is accomplished by a hydraulic motor operated from the central hydraulic system of the truck. Controls for lift and tilt are foot-operated and the control for rotating the forks is located beside the driver's seat. While the basic truck is rated at 2000-lb with a 48-in. load length, the actual working capacity of the truck with attachment is 1500-lb with a 36-in. load length. A lift height of 130-in. is possible. The truck pictured here is an extremely compact one. It is capable of stacking 48-in. long loads in aisles only 9-ft 6-in. wide. *Lewis-Shepard.*

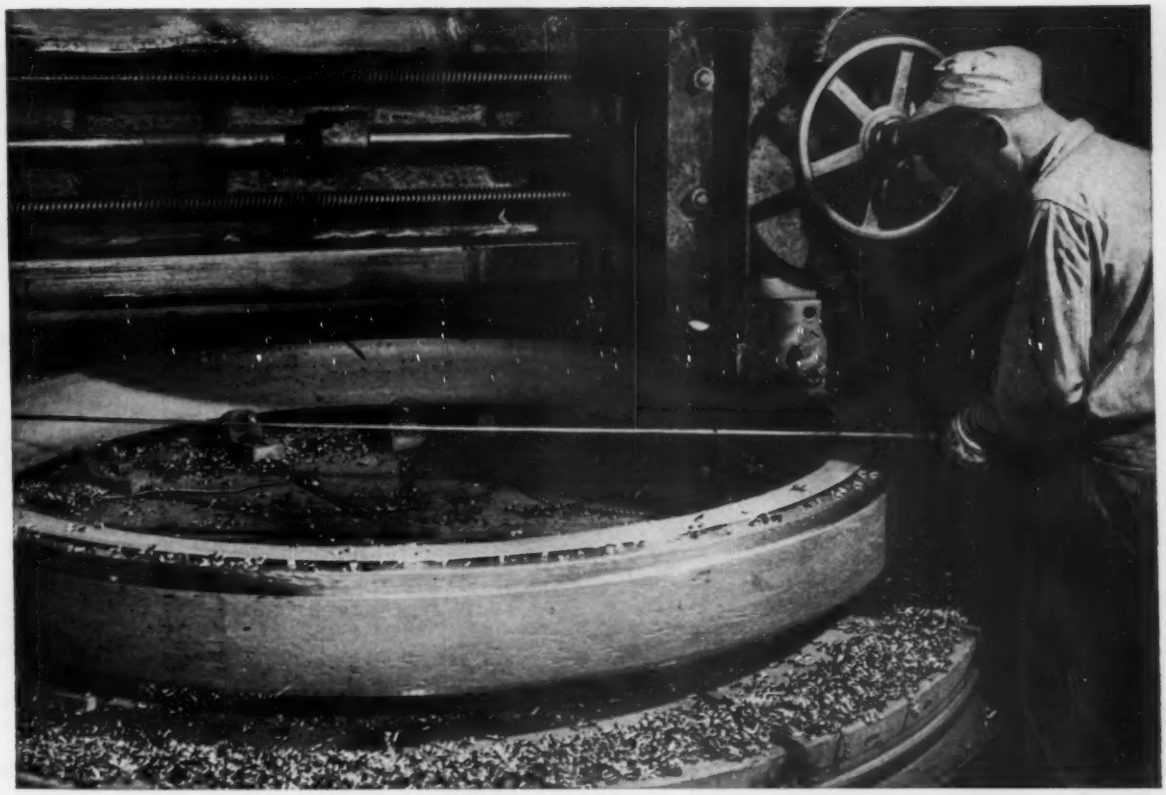
For more data circle No. 30 on postcard, p. 125



Furnace handles laboratory or production jobs

Laboratory analysis and production work can be handled with a new high temperature tube furnace. Its safe working temperatures range from 1700°F to 2600°F. The working chamber is 27-in. long and will accommodate tubes up to 5-in. OD. Overall length is 42-in. Silicon carbide heating elements are arranged perpendicular to the tube, above and below the furnace chamber, for uniformity. It has three layers of graded insulation. Three separate zones of temperature control enable the operator to produce variable heating conditions. Each zone is regulated by its own tap-changing transformer with 36 steps of input control. The transformers and controls are built into an enclosed furnace stand making this unit a compact integral assembly. Furnace chamber is at operator's height. This furnace is particularly recommended by its manufacturer when a prepared atmosphere must be kept free from contamination or when the material being heated releases corrosive gases. *Hevi-Duty Electric Co.*

For more data circle No. 31 on postcard, p. 125



Here's proof of Hi-Qua-Led's performance in ALCO seamless forged and rolled rings:

"Roughing cuts reduced by ½
. . . cutter costs by ⅓
. . . running time by 12¼ hours
. . . surface finish: greatly improved"

Tremendous savings in machining time and reduced tool costs are reported by our ring customers who have used ALCO's new Hi-Qua-Led Steel*. Here's what one customer reports:

"The leaded steel machined successfully using half the normal number of roughing cuts and at greatly increased speeds. Surface finish was greatly improved. Normal surface finish on 4140 steel was from 80 to 125 rms, while surface finish on the two test gears was from 40 to 60 rms. Total running time per gear was reduced by 12.18 hours. Cutter costs were reduced by approximately one-third."

Make the comparison right in your own shop. Let ALCO furnish you a trial lot of Hi-Qua-Led steel rings along with your usual grade. See the advantages it brings in faster machining, with less power, reduced tool wear. Hi-Qua-Led may be obtained in any size ALCO forged ring. For complete information contact your nearest ALCO Sales Office.

*Trade-mark Reg. applied for. Patent applied for on lead-addition method.

Other customer tests of Hi-Qua-Led's machinability are equally impressive:

- **41L37 — Brinell Hardness 290-330**
  Turning — Speed increased from 2¾ rpm to 6 rpm. Depth cut: from ⅛ in to 3/16 in. Machining time improved: 69 per cent.
  Teeth-Cutting — Tool life increased 1600 per cent. Tool wear decreased 95 per cent.
- **41L40 — Brinell Hardness 285-302**
  Turning — Speed increased from 17 rpm to 25 rpm. Machining time improved 47 per cent.
  Teeth-Cutting — Tool life increased 427 per cent. Tool wear decreased 77 per cent. Machining time improved: 41.2 per cent.

Your copy of "Facts on Leaded Steel for Seamless Forged and Rolled Rings," is waiting for you. Just write ALCO Products, Inc., P. O. Box 1065, Schenectady 1, New York.

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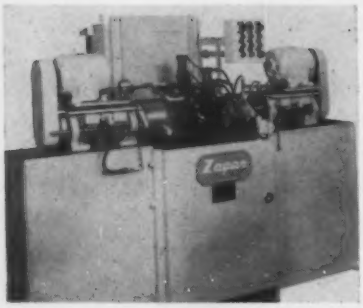


Two multiple spindle heads drill a variety of holes

Two multiple spindle heads drill a variety of hole patterns with a new setup. The screw holes in three revolver handles and barrel holder are completely drilled by two drill heads. The change from one part to another is accomplished via the fixturing. Each fixture holding the revolver handle is self-contained and can be inserted in the machine quickly. The drill heads, mounted on opposed feed units on either side of the work-holding fixture, are rotated to the proper position of the specific handle being drilled. Automatic cycling, approach, feed and return are hydraulically controlled. All holes are drilled in one pass. *Zagar, Inc.*

For more data circle No. 32 on postcard, p. 125

Pocket sized pH meter operates on inexpensive batteries

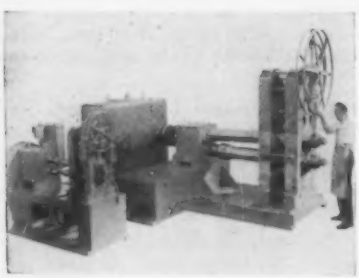
Versatile and comparatively low priced, a pocket-sized pH meter for acidity and alkalinity measurements uses a combination electrode. It is described as accurate, dependable and easy-to-operate. The new pocket pH meter is battery operated, has a wide variety of applications in metal finishing and plating, industrial research and testing laboratories. Range is from two to 12 pH. The single electrode combines both reference and glass electrodes and has been specially developed with the new meter. The instrument also has a memory dial for use in standardizing. It operates from simple, inexpensive hearing-aid and flashlight batteries. *Scientific Instruments Div., Beckman Industries, Inc.*

For more data circle No. 33 on postcard, p. 125

Portable ramps provide roadway over hose

Here is the answer to stopped traffic or emergency "corduroy" roads because of flexible hoses on the ground. New, portable Hose Ramps make a smooth roadway for traffic to pass over fire hoses, fuel lines, air hoses, etc., up to 4-in. in diameter. Each ramp is made of lightweight magnesium (36 in. long, 16 in. wide) and constructed to give rigid support of 10,000 lb. They are also available up to 40,000 lb support each. Diamond safety tread provides good traction in all weather. Pairs of ramps are held together by heavy neoprene belting to give flexibility on rough terrain and allow sections to fold for easy storage. *Copperloy Corp.*

For more data circle No. 34 on postcard, p. 125



Giant mill features special design

This giant size rolling mill is capable of either two-high or four-high operation. It features a special work roll bearing design which permits perfect alignment of bearings under extreme loading conditions. For two-high operation, the mill can be equipped with rolls of 6, 8, 10, or 12 in. diam, and for four-high operation, work rolls of either 6 or 8 in. diam can be used. The mill is equipped with 2 sets of pinion drives. A special housing transfer mechanism is incorporated to shift the location of the roll housings if desired. These permit maximum torque. *Fenn Mfg. Co.*

For more data circle No. 35 on postcard, p. 125

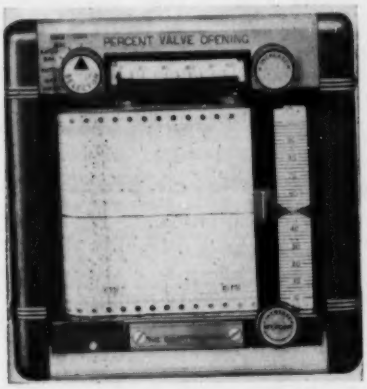
Teflon hose assemblies have full-flow fittings

Teflon hose assemblies consist of a Teflon liner encased in stainless steel wire braid with specially engineered full flow fittings permanently locked to the hose. The units are capable of sustained operating pressures up to 400 psi at temperatures from 100 to 500°F. They are recommended for use wherever high chemical resistance, freedom from contamination, wide temperature and pressure range, non-aging, flexibility and ruggedness are prime requirements. *The Mic-Lin Co.*

For more data circle No. 36 on postcard, p. 125

Electronic controls

Based on the well-known autronic principle of instantaneous, all-electronic control, a new line of unitized controls advertises a number of advantages over other systems. Among these advantages are: controller, recorder (or indicator) and manual control are of plug-in construction; any combination of units is contained within a



universal mounting case requiring a single standard panel cutout of only 5 x 5-in.; wiring between individual instruments has been eliminated; instruments can be easily pulled out of panel for calibration, test or maintenance without employing "jumpers." *The Swartout Co.*

For more data circle No. 37 on postcard, p. 125

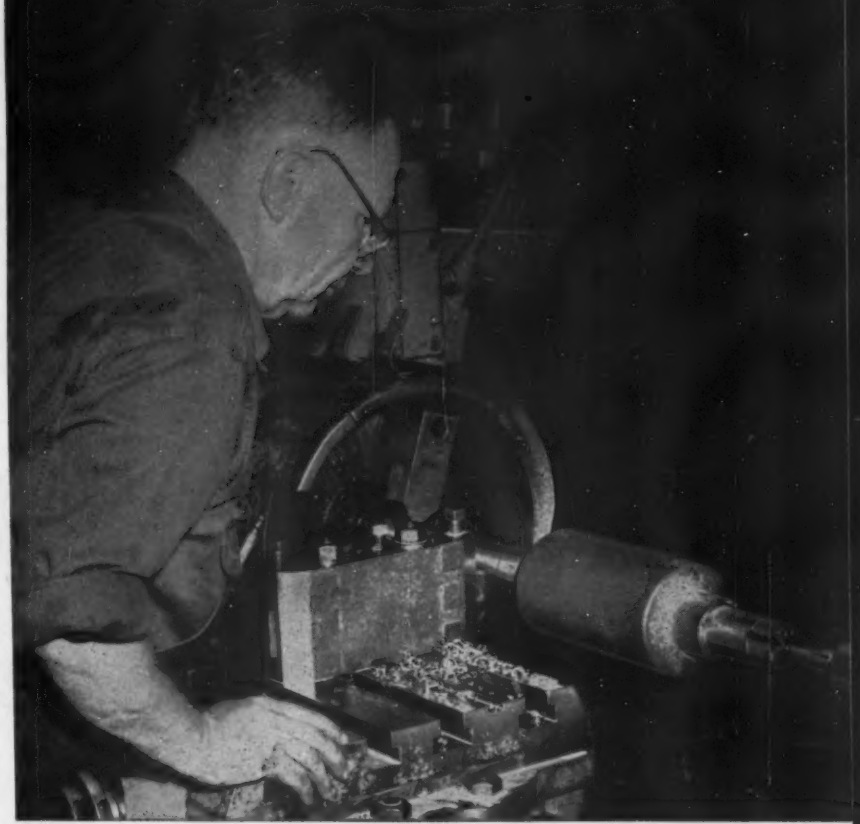
Impact machine

This is the latest and largest in the variable stroke series of impact machines made by one firm. It is a single acting air hammer, in which a heavy hammer strikes once each time the main valve is opened. Impact is transmitted through a tool-holding collet chuck which projects through the bottom of the hammer cylinder. An air traverse cylinder, actuated by a foot valve, lowers the hammer cylinder until the tool is firmly in contact with the work. Then an overtravel in the linkage trips the main valve and releases the hammer. An air clamp holds the hammer cylinder against recoil or rebound during the hammer blow. Impact range is from zero to 20,000 lb. *Heidrich-Nourse Co.*

For more data circle No. 38 on postcard, p. 125

STAY OUT OF TROUBLE WITH A

FORGING!



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The part illustrated above *will* become a component of the completed product — will *not* become a reject — BECAUSE IT IS A FORGING.

You get effective machinability because forgings are dense, homogenous metal, free of porosity and other flaws. Forgings start with *forging quality metal* which is improved by the forging process. This fact also offers advantages in heat treating and welding.

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Reduce your cost by using forgings. Send for booklets, ☐ "What is a Forging?" and ☐ "Management Guide to the Use of Forgings."

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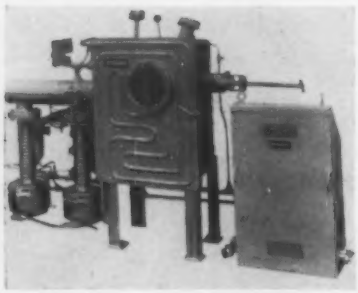
Symbolic emblem of the Drop Forging Association

Safety solvent tank cleans metal parts, assemblies

Safe cleaning of metal parts and assemblies is the key feature of this new safety solvent tank. It can be combined in numerous ways with others to provide a complete, yet low cost cleaning department for all types of manufacturing operations. All tanks have fusible link safety covers to provide protection in case of fire. They are built to comply with Factory Mutual Standards. Some tanks are equipped for air agitation with an automatic safety cover. Tanks are sturdy and clean parts and assemblies up to 20 in. wide. A space conserving design means that only 15 to 20 gal of cleaning solution is needed. Air agitation helps remove loosened soil and gums from all parts to speed cleaning. Only two lb of air is required; this is easily controlled by an external valve. A rack is provided to support parts 1½ in. above sludge level. A drain valve in the tank's middle front allows a bucket to collect dirty solvent when tank is drained. Tank is 24 x 20 in. x 18 in. deep. *Graymills Corp.*

For more data circle No. 39 on postcard, p. 125



Furnace designed for fast-cycle production

Especially designed for precision casting operations, a new vacuum furnace is suitable for "all-out" production. It is capable of melting and pouring single casts of 5 to 17 lb, under vacuums as low as 2 microns. The unit is designed primarily for economical, fast-cycle production of precision components. Either investment casting or permanent mold procedures by remelting high-purity vacuum-melted or air-melted alloys is possible. Vacuum-melted alloys require only about half the melting time of primary metal which has to be refined under vacuum. It can incorporate bridge-breakers and thermocouples. *F. J. Stokes Corp.*

For more data circle No. 40 on postcard, p. 125

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with exceptional forming qualities
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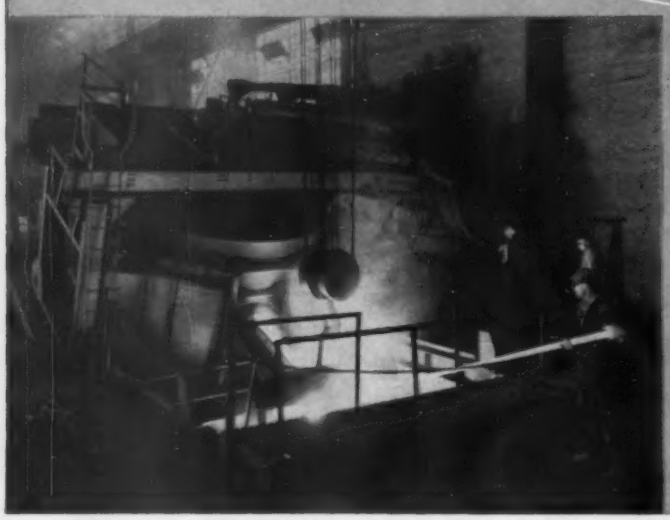
Stainless-Clad



Whatever your needs for stainless steel sheets and plates, remember that Ingersoll specializes not only in *solid* stainless, but in *heat-resisting* alloys, and *stainless-clad* sheets as well.

So our recommendations are unbiased, and are based on your *needs*. Consult our engineers, without cost or obligation.

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Borg-Warner Corporation
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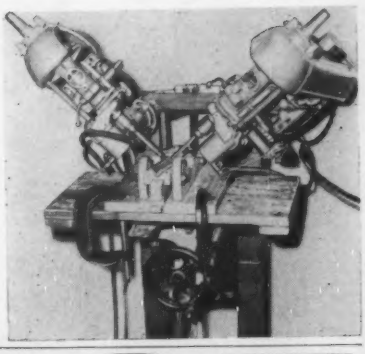
Plant: New Castle, Ind.

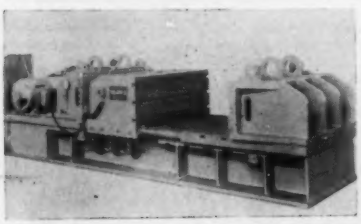
Two air-powered drill presses set on V-mounting



Two drill presses powered by pneumatic drill feeds are centrally controlled by a three-way foot valve. This helps to economize on time and effort, the maker says. Air powered drill presses pivotally mounted on two horizontal columns can be rotated to a horizontal, vertical or angular plane, each independent of the other. The positions may be altered to suit various jobs. A typical set-up allows simultaneous air-powered drilling of two holes in furniture parts. In this case the introduction of pneumatic equipment not only increased output but also made it possible for a female worker to perform the simplified operation, according to the manufacturer. *Mead Specialties Co.*

For more data circle No. 41 on postcard, p. 125

Bending machine



This 200-ton hydraulic bulldozer has full electrical control, for automatic or semi-automatic operation. Designed for unusually heavy bending operations, the unit is large in size and of sturdy, rugged construction. It is portable, for convenient moving about the plant as required. Both the control box and pumping unit are built-in. It has hardened steel slide ways. Bed is protected by reversible hardened steel wear plates. Operation, including jogging, is by foot switch control. No pre-setting of press stroke is necessary. To change jobs the operator simply changes dies. Length is 17 ft 8½-in. width 6 ft, overall height 4 ft 8-in. Opening is adjustable from 60 in. maximum to 12 in. minimum. *American Steel Foundries.*

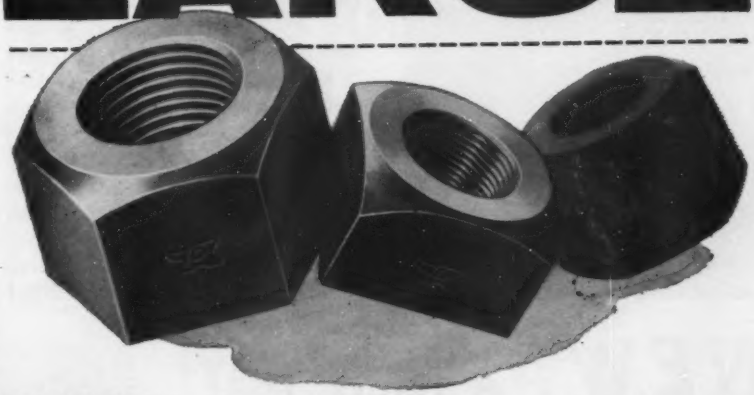
For more data circle No. 42 on postcard, p. 125

Chatterless boring

Vibration-proof and chatterless, a new boring bar is equipped with a micrometer adjustment to adjust cutting tools in 1000ths. It bores out material without chatter, absorbs shock and vibration. *Modern Mfg. Co., Inc.*

For more data circle No. 43 on postcard, p. 125

LARGE



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THERE'S NO SUBSTITUTE FOR QUALITY

Power turret unit punches 12-gage mild steel

Air hydraulically operated, a new punch turret is capable of punching a two in. hole in 12-gage mild steel or in 14-gage stainless steel. It supplies 18 stations ranging from 5/32-in. to two in. Smaller sizes allow punching heavier gage metal. This model has a newly designed stand and table on which it is mounted. Odd shaped punch and die sets including square, rectangular, tube socket and others are available from the maker for punching panels and chassis. The new model offers many special features for speed, efficiency and operator convenience. The foot control can be moved out or sideways to any position the operator finds comfortable. A self-loading oiling system is among its advantages. The unit was designed in reply to many requests from users of the company's hand models. *Rotex Punch Co.*

For more data circle No. 44 on postcard, p. 125

Surface projector is self-contained, portable

Designed as a self-contained portable projection magnifier, a low-cost contour and surface projector is suited for efficient, fatigue-free inspection and examination. It allows examination of relatively flat objects and small parts, imprinted circuits, fine print of small scale drawings and like applications. Two models are available: one enlarges the original material three times; the other, five times. It can be used for prolonged periods, without eye strain, in any normally lighted area. Operation is so simple anyone can use it. Small objects or flat materials to be examined are placed on a roomy two-way movable platform. The counter-balanced optical head is lowered into contact and the image is projected onto a 4½ x 12 in. screen. *Instrument Div., American Optical.*

For more data circle No. 45 on postcard, p. 125

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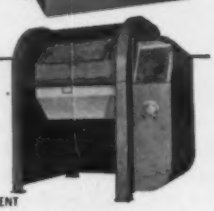

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Pre-fab corners

Spherical corners in sheet metal size thicknesses are additions to one company's line of prefabricated parts for weldments. They are intended for use on cabinets, pans, trays, panels, etc., which require round edges. All that is necessary

is to notch the four corners of the sheet, bend the edges to the desired radius and then weld the corners into place. They are carried in stock in 96 sizes, radii range from ½ to 3-in. and thicknesses from 18 to 10 gage. Spherical corners can be furnished in mild steel, stainless steel and aluminum. *Conner Steel Products.*

For more data circle No. 46 on postcard, p. 125

Magnetic clamp

Portable electro-magnetic plate clamps position and hold work for welding. It weighs only 78 lb and stands 10 in. high (earlier models were 16 in. tall). The super-compact unit has been made possible due to a new, reduced rectifier

element. This cuts the housing unit nearly in half. *Buck Mfg. Co.*

For more data circle No. 47 on postcard, p. 125

TIME to check FASTENER COSTS and reduce them with STUD WELDING

. . . the fastest electric arc welding process for end welding fasteners

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stud welding division
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The Iron Age SUMMARY . . .

Detroit holds key to fourth quarter market . . . But carmakers holding back until market is clarified . . . A scramble would leave some users in lurch . . . Controls question.

Anxious Seat . . . Steel producers are waiting anxiously for the automotive shoe to drop. What Detroit does will mean the difference between a "comfortably tight" market and an all-out year-end scramble.

What steel men are afraid of is that the automotive push will play havoc with an already-tight fourth quarter outlook. It would come at a time when practically every other industry will be fighting for a preferred spot on order schedules.

The auto makers have been hanging back for three reasons: (1) production delays growing out of drastic model changes, (2) hesitancy to load up rebellious dealers, and (3) willingness to let the mills be their "warehouse" as was the case before the sellers' market put them on the defensive.

Detroit's production problems are merely postponing the automotive tidal wave. As a result of production delays, the industry will make considerably fewer cars in October than was originally planned.

Groundswell Forming . . . And even with these problems, the auto industry has turned down only minor tonnages offered by the mills. What was left was gratefully gobbled up by other consumers. For some mills, November and December are considered spoken for, from a practical standpoint.

What it adds up to is that a sharp upturn in new car sales—and there are indications that a groundswell is taking shape—will leave many steel consumers holding the short end of the stick—at least for fourth quarter and probably first quarter of 1957.

Meanwhile, the Government's proposed big oil tanker program is confronting steel producers with another worry: possible imposition of controls on plates and structurals. It all depends on whether the tanker program gets the green light.

Already Bad . . . Giving shipbuilders a preferred spot on plate and structural order books would aggravate a near-fantastic market situation for these two products—a situation that is forcing cutbacks in fabricator plants and serious delays in the building of schools, churches, and plants. Also, it probably would lead to a clamor by other industries for defense ratings. Fate of the tanker program hinges on developments in the Suez Canal crisis.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,498	2,498	2,474	2,413
Ingot Index				
(1947-1949=100)	155.5	155.5	154.0	150.0
Operating Rates				
Chicago	101.5	102.0*	101.0	97.5
Pittsburgh	102.0	100.0*	102.0	105.0
Philadelphia	106.5	104.0	102.0	104.0
Valley	98.0	98.0	99.0	99.0
West	106.0	105.0	99.0	98.5
Detroit	105.0	105.0	102.0	95.0
Buffalo	105.0	105.0	105.0	105.0
Cleveland	108.0	104.0	106.0	104.0
Birmingham	96.0	96.0	96.0	94.0
S. Ohio River	96.0	97.0*	90.0	92.0
Upper Ohio R.	106.0	106.0*	106.0	100.0
St. Louis	94.5	103.0	97.0	97.0
Northeast	100.0	100.0	100.0	97.0
Aggregate	101.5	101.5	100.5	100.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.622	5.622	5.622	5.174
Pig Iron (Gross Ton)	$63.04	$63.04	$63.04	$59.09
Scrap, No. 1 hvy (gross ton)	$56.83	$56.17	$58.17	$44.50
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	24.40
Copper, electrolytic	40.00	40.00	40.00	43.00
Lead, St. Louis	15.80	15.80	15.80	15.30
Magnesium ingot	36.00	36.00	36.00	33.25
Nickel, electrolytic	64.50	64.50	64.50	64.50
Tin, Straits, N. Y.	107.25	106.75	104.875	96.50
Zinc, E. St. Louis	13.50	13.50	13.50	13.00

*Revised

Full Order Books Are Certain

Despite what auto buyers do in next two months it's a sell-out on most products for balance of year . . . More producers revise merchant wire product price bases.

◆ THERE WON'T BE any empty space in fourth quarter order books no matter which way automotive buyers jump.

Despite some last minute deferments by auto industry buyers, both hot and cold-rolled products are sold out through the rest of '56, with first quarter carryovers in some areas on hot-rolled sheet.

Bar orders are also solid through December, plate and structurals are, of course, hopeless with deliveries ranging up to 20 months. And pipe and tubing, tinplate and stainless products are about wrapped up, supplywise, for this year. While automotive orders for wire products are lagging, other users are buying strongly and increased demand from the carmakers would tighten the market in a hurry.

Overall prospect is for a really hot market by the first of the year with a "short rations" sign going up on the product supply bin.

More producers this week made revisions in mill base prices for merchant wire products. (For changes see merchant wire products prices on p. 161.) The move follows announcements of similar nature several weeks ago by U. S. Steel and Republic. Producers effecting changes this week include Sheffield Steel, Bethlehem Steel, Youngstown Sheet and Tube, Northwestern Steel & Wire, Keystone Steel & Wire, Mid-states Steel & Wire, Colorado Fuel & Iron Corp., and Atlantic Steel Co.

Here's the product supply picture in detail:

SHEET AND STRIP . . . There's evidence of a sell-out for rest of the year on both hot and cold-rolled products at **Detroit.** Cold-rolled isn't quite as bad as hot-rolled where there will be a definite carryover.

Expected December push by automakers at **Pittsburgh** mills for cold-rolled sheet hasn't materialized. However, carmakers are taking more than in November.

Books at **Cleveland** are about filled for December, but some spot tonnages are still available through last minute deferments from automakers. These delays are confusing the supply situation as consumers get held off, read about tight market, and then are offered needed tonnage for short delivery.

Hot and cold-rolled sheet continue strong at **Chicago** with carryovers of four weeks and up on hot-rolled sheet. Cancellations on hot-rolled are creating problems with some buyers getting good delivery and others writing conversion orders for it. Cold-rolled schedules call for capacity operations through the year.

On **West Coast** hot-rolled sheets are very tight.

BARS . . . Forging bars and regular merchant quality carbon bars are very short at **Detroit.** Situation probably won't ease until after first quarter—if then. Cold finished bars are strong at **Pittsburgh** mills. October was a good month for the mills with few soft spots.

At **Cleveland** hot-rolled bars are sold out through December and books are not open beyond that point. Deliveries are being held current largely because of restricted bookings. Cold finished bar continues slow with 3 weeks delivery.

Hot-rolled carryovers at **Chicago** are developing. Deliveries are 2-4 weeks. Producers are quoting 45-day delivery on cold finished bar, but have backlogs running into first quarter on annealing space.

PLATES AND STRUCTURALS . . . Entire supply picture is extremely depressing. At **Detroit** normal waiting time for either product is at least 20 months with an indication that the gap will widen still more. One mill in area is cutting plate conversion because of demand for other products.

While mills at **Chicago** have open books on structurals for this quarter they eliminated backlogs by cutting fourth quarter quotas. Structurals ordered before strike are just now being delivered. Plate facilities are tied up for next year and conversions are closed for first quarter.

WIRE . . . Orders for manufacturers' wire are coming in fairly heavy at **Detroit** from furniture makers and others. Automotive is lagging.

Manufacturing grades are strong at **Detroit** with vendors not able to get enough of some sizes. Delivery time is stretched out to 6-8 weeks.

Capacity operations through first quarter on all wire products are indicated at **Chicago.** Consumer inventories of wire are low on all grades.

PIPE AND TUBING . . . **Pittsburgh** makers of both seamless and welded pipe are sold out for rest of the year. There's been no sign of decline in either ordering or shipments of oil country goods. Pipemakers are somewhat concerned over inventory position of the petroleum industry.

TINPLATE . . . Mills at **Pittsburgh** are booked to capacity on electrolytic lines. Shipments are going out rapidly but can companies are running into spot shortages due to high fall consumption. Mill inventories of tinplate are relatively low.

STAINLESS . . . There's solid booking on most stainless products for rest of the year. One mill at **Pittsburgh** reports sheet and plate are very strong. Order picture is described as spotty beyond this quarter.

Purchasing Agent's Checklist

SPECIAL REPORT: How big a customer is automotive industry? A look at metalworking's stake in production of the new cars . . . . . p. 63

IRON AGE INTERVIEW: . . . Magnesium's top man sees output up; tells consumers what the future may bring in terms of production and price . . . . . p. 66

GOVERNMENT: . . . Nickel stockpiling may be halted by year's end . . . . . p. 71

CONTROLS: New oil tanker program may mean allocation of plates and structurals . . . . . p. 67

TECHNICAL: Save by knowing your drawing lubricant ingredients . . . . . p. 103

Comparison of Prices

(Effective Oct. 23, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Oct. 23 1956	Oct. 16 1956	Sept. 25 1956	Oct. 25 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.325
Cold-rolled strip	6.870	6.870	6.870	6.29
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	9.30
Stainl's C-R strip (No. 302)	47.50	47.50	47.50	44.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.85	$9.85	$9.85	$9.05
Tinplates, electro (0.50 lb.)	8.55	8.55	8.55	7.75
Special coated mfg. ternes	9.10	9.10	9.10	7.85
Bars and Shapes: (per pound)				
Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	40.75	40.75	40.75	38.25
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	7.20¢	7.20¢	7.20¢	6.25¢
Rails: (per 100 lb.)				
Heavy rails	$5.075	$5.075	$5.075	$4.725
Light rails	6.00	6.00	6.00	5.65
Semifinish Steel: (per net ton)				
Rerolling billets	$74.00	$74.00	$74.00	$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	91.50	91.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.225	4.225	4.225	4.225
Finished Steel Composite: (per pound)				
Base price	5.622¢	5.622¢	5.622¢	5.174¢

	Oct. 23 1956	Oct. 16 1956	Sept. 25 1956	Oct. 25 1955
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$67.76	$67.76	$67.76	$63.69
Foundry, Valley	63.00	63.00	63.00	59.00
Foundry, Southern Cin'ti	67.17	67.17	67.17	62.93
Foundry, Birmingham	59.00	59.00	59.00	55.00
Foundry, Chicago	63.00	63.00	63.00	59.00
Basic del'd Philadelphia	66.84	66.84	66.84	62.77
Basic Valley furnace	62.50	62.50	62.50	58.50
Malleable, Chicago	63.00	63.00	63.00	59.00
Malleable, Valley	63.00	63.00	63.00	59.00
Ferromanganese, cents per lb‡	11.75¢	11.75¢	10¾-11¾¢	9.50¢
74 to 76 net Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$63.04	$63.04	$63.04	$59.09
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$57.50	$55.50	$58.00	$44.50
No. 1 steel, Phila. area	56.50	56.50	58.00	46.50
No. 1 steel, Chicago	56.50	56.50	58.50	42.50
No. 1 bundles, Detroit	56.50	56.50	56.50	39.00
Low phos., Youngstown	64.50	64.50	66.50	49.00
No. 1 mach'y cast, Pittsburgh	59.50	59.50	60.50	50.50
No. 1 mach'y cast, Philadel'a	58.00	58.00	58.00	47.50
No. 1 mach'y cast, Chicago	56.50	56.50	59.50	52.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	56.83	$56.17	$58.17	$44.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50	$14.50	$14.50	$13.25
Foundry coke, prompt	$17-18	$17-18	$17-18	$16.25
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	40.00	40.00	40.00	43.00
Copper, Lake, Conn.	40.00	40.00	40.00	43.00
Tin, Straits, New York	107.25†	106.75	104.875	96.50
Zinc, East St. Louis	13.50	13.50	13.50	13.00
Lead, St. Louis	15.80	15.80	15.80	15.30
Aluminum, virgin ingot	27.10	27.10	27.10	24.40
Nickel, electrolytic	64.50	64.50	64.50	64.50
Magnesium, ingot	36.00	36.00	36.00	33.25
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. • Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 160→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	64.50	65.00	65.50	66.00	.....
Birdsboro, Pa. *B6*	64.50	65.00	65.50	66.00	.....
Birmingham *R3*	58.50	59.00•	.....	.....	.....
Birmingham *W9*	58.50	59.00•	63.00	.....	.....
Birmingham *U4*	58.50	59.00•	63.00	.....	.....
Buffalo *R3*	62.50	63.00	63.50	64.00	.....
Buffalo *H1*	62.50	63.00	63.50	.....	.....
Buffalo *W6*	62.50	63.00	63.50	64.00	.....
Chester *P2*	64.50	65.00	65.50	.....	.....
Chicago *I4*	62.50	63.00	63.00	63.50	.....
Cleveland *A5*	62.50	63.00	63.00	63.50	67.50†
Cleveland *R3*	62.50	63.00	63.00	63.50	.....
Duluth *I4*	62.50	63.00	63.00	63.50	67.50†
Erie *I4*	62.50	63.00	63.00	63.50	67.50†
Everett *M6*	.....	63.75	64.25	.....	.....
Fontana *K1*	70.00	70.50	.....	.....	.....
Geneva, Utah *C7*	62.50	63.00	.....	.....	.....
Granite City *G2*	64.40	64.90	65.40	.....	.....
Hubbard *Y1*	.....	.....	63.00	.....	.....
Lone Star *L3*	58.50‡	59.00‡	.....	.....	.....
Midland *C11*	62.50	.....	.....	.....	.....
Minnequa *C6*	64.50	65.00	65.50	.....	.....
Monessen *P6*	62.50	.....	.....	.....	.....
Neville Is. *P4*	62.50	63.00	63.00	63.50	67.50†
N. Tonawanda *T1*	.....	63.00	63.50	64.00	.....
Pittsburgh *U1*	62.50	.....	63.00	63.50	.....
Sharpsville *S3*	62.50	63.00	63.00	63.50	.....
So. Chicago *R3*	62.50	63.00	63.00	.....	.....
Steelton *B3*	64.50	65.00	65.50	66.00	70.50
Swedeland *A2*	64.50	65.00	65.50	65.50	.....
Toledo *I4*	62.50	63.00	63.00	63.50	.....
Troy, N. Y. *R3*	64.50	65.00	65.50	66.00	.....
Youngstown *Y1*	.....	.....	63.00	63.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. • Add $1.00 for 0.31-0.49 pct phos. † Intermediate low phos. ‡ Add $1.00 for 0.31 to 0.50 pct phos.

Silvery Iron: Buffalo, *H1*, $72.50; Jackson, *J1*, *I4* (Globe Div.), $71.50; Niagara Falls (15.01-15.50), $99.50; Keokuk (14.01-14.50), $102.00; (15.51-16.00), $105.00. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 14 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon: $64.00.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	19.75	21.00	20.50	22.00	—	23.25	35.25	28.25	32.75	—	16.00	27.75	16.25
Slabs, billets	24.50	27.25	25.25	28.00	28.50	29.25	44.50	35.75	42.00	—	20.75	—	21.00
Billets, forging	—	33.00	33.75	34.00	37.00	36.00	56.25	42.25	50.25	30.75	27.25	27.75	27.75
Bars, struct.	39.00	39.25	40.50	40.75	43.75	43.00	66.75	50.25	59.00	36.25	32.50	33.00	33.00
Plates	—	41.25	42.50	43.00	45.50	45.75	70.25	54.50	63.75	38.75	33.75	35.50	34.50
Sheets	45.00	45.25	47.25	47.50	55.75	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Strip, hot-rolled	33.00	35.75	34.00	36.75	—	39.75	63.50	48.75	58.25	—	29.75	—	30.75
Strip, cold-rolled	41.50	45.25	43.75	47.50	52.00	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Wire CF; Rod HR	—	37.25	38.50	38.75	41.75	41.00	63.75	48.00	56.25	34.50	31.00	31.50	31.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Philadelphia, *D5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (.25 per lb higher); New Bedford, Mass., *R6;* Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4;* Philadelphia, *D5;* Detroit, *R5;* Gary, *U1.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3* (.25¢ per lb lower on Types 301, 303 and 316); Monessen, *P1;* Syracuse, *C11* (.25¢ per lb lower on Type 301, 304, and 316); Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Philadelphia, *D5;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1.*

New Strength Invades Market

Pittsburgh advance reflects stronger market . . . Scattered increases characterize continued demand from capacity steel operations . . . Blast furnace grades also advance.

◆ THE MARKET appeared on the verge of a general price rise following significant increases in Pittsburgh, Chicago and elsewhere in the Midwest. Bullish signs in major consuming areas more than offset some weakening in areas that lack big consuming mills.

Purchases by a mill in Pittsburgh's fringe areas brought the price of No. 1 steelmaking grades up $2. In Chicago, No. 2 heavy melting, turnings, and some premium grades climbed. Only the absence of significant tonnage purchases of No. 1 grades prevented a general climb in the Midwest.

In Philadelphia, prices held firm and some broker activity is reported at slightly higher prices, although not in substantial tonnage to reflect a price hike.

General strength in the Midwest is also reflected in Cleveland, where the market rebounded to some extent.

In some areas, mills are staying out of the market, counting on further reductions in prices similar to those of recent weeks. Whether they can outride the new tone of strength remains to be seen.

Elsewhere, scattered increases in blast furnace grades occurred, reflecting the possibility of an ore shortage and capacity blast furnace operations through the winter.

On the basis of the $2 increase in Pittsburgh, THE IRON AGE Composite Price rose to $56.83, up from $56.17 where it had leveled off after the recent decline.

In spite of the spot instances of weakness in isolated cases, continued high operating rate, a seasonal lag in collections as winter approaches, and the possible ore shortage indicate sustained strength.

Pittsburgh . . . Top steelmaking grades have turned upward again after marking time for several weeks. Stimulus was provided by purchase on fringe of the district equivalent to $58 for No. 1 heavy melting in Pittsburgh. Bidding on latest railroad list for delivery to a Pittsburgh mill established No. 1 railroad at $2 higher. Turnings also moved up in keeping with increased blast furnace demand. Buying is concentrated in prime grades, leaving secondary openhearth material unchanged.

Chicago . . . Despite a lack of widespread mill purchasing, scrap prices began creeping up on a scattering of spot orders, and there are strong indications that another $1 to $2 increase is in the wind. Broker buying prices are up, dealer stock of most grades, including turnings, are again sufficiently low that dealers are not willing to sell. Only a lack of purchases in quantities seemed to be holding consumer prices in check.

Philadelphia . . . This market is holding steady. There was some evidence of brokers buying at $1 above the market, but this is attributable to cleaning up last month's orders, and is not representative. Generally, there is no active pressure by brokers or mills and dealers are waiting for mill purchases which for two weeks have not been forthcoming. Scrap is coming in fair volume and export continues active.

New York . . . Prices are down $1 for steelmaking and cast grades. The softening trend is expected to last only until the end of the month when mill orders should come in heavily. Brokers at present are concerned with cleaning up old orders. The drop in cast prices was caused by a cut in buying prices by New Jersey pipe foundries.

Detroit . . . The market continues to mark time here in anticipation of November auto lists which begin closing this week. Both brokers and dealers believe prices will be off slightly from last month. More scrap will be available this month, but continued high operating rate will keep the market strong.

Cleveland . . . Market has regained strength to the extent of a $1 price increase. Local mills are paying to keep scrap in the area. The Valley market is somewhat softer with isolated tonnages moving slightly under quoted limits. Some Valley mills are attempting to purchase secondary scrap at quoted prices, but find few takers because of tonnage ratios. Definite trend will be set this week with monthly auto lists.

Birmingham . . . An Atlanta mill purchased openhearth scrap this week at current prices. Alabama mills remained out of the market. Weekness appeared in electric furnace grades, but most specialties remained steady. Despite high prices being paid for cast for export, the domestic market is on the soft side. Dealers report a scarcity of scrap. Some exporters were in the market again at $2 to $3 below prices previously paid.

St. Louis . . . Shipments of scrap to the St. Louis district are slipping, and a further decline is expected as a result of the shortage of cars. The market continues strong generally, following heavy receipts. Market for rerolling rails has dropped sharply $5 a ton. Random rails are also off $1.

Cincinnati . . . Area industrial lists are expected to go higher next month as some market tightness sets in. But shipments continue good on old orders. Local mills are in better inventory position than at any time in months.

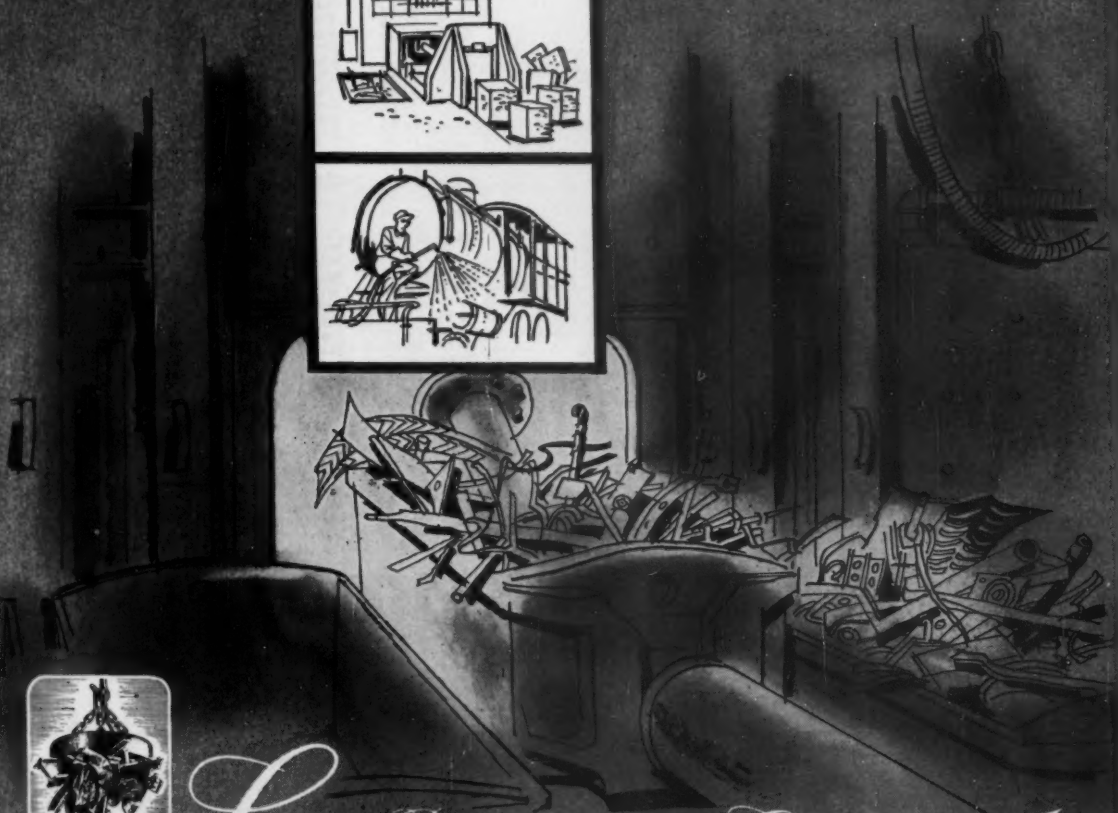
Buffalo . . . Indications point to a slight decline despite current steady market. Two small sales were reported, but the area's biggest consumer is still out of the market. When it buys, that will determine strength of the market here.

Boston . . . Prices remain steady although the market is generally quiet. Export is at a minimum, with one area buyer active in the market.

West Coast . . . Strong domestic demand and continued heavy export to Japan combine to keep this market strong. Mills are operating at a high rate and are bucking export prices.

Leaders in Iron & Steel Scrap Since 1889

For over half a century our experience, personnel, equipment and key office locations have contributed to the steady growth of the iron and steel industry. Possibly our facilities may help you solve a problem in iron or steel scrap—no matter how big or small.



Luria Brothers and Company, Inc.

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IMPORT & EXPORT—**LIVINGSTON & SOUTHARD, INC.,** 99 Park Ave., New York, N. Y. • *Cable Address:* **FORENTRACO**

Scrap Prices *(Effective Oct. 23, 1956)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$57.00 to $58.00
No. 2 hvy. melting	49.00 to 50.00
No. 1 bundles	57.00 to 58.00
No. 2 bundles	46.00 to 47.00
Machine shop turn.	39.00 to 40.00
Mixed bor. and ms. turn.	39.00 to 40.00
Shoveling turnings	44.00 to 45.00
Cast iron borings	44.00 to 45.00
Low phos. punch'gs plate	68.00 to 69.00
Heavy turnings	55.00 to 56.00
No. 1 RR. hvy. melting	67.00 to 68.00
Scrap rails, random lgth.	81.00 to 82.00
Rails 2 ft and under	79.00 to 80.00
RR. steel wheels	73.00 to 74.00
RR. spring steel	73.00 to 74.00
RR. couplers and knuckles	73.00 to 74.00
No. 1 machinery cast.	59.00 to 60.00
Cupola cast.	51.00 to 52.00
Heavy breakable cast.	49.00 to 50.00

Chicago

No. 1 hvy. melting	$56.00 to $57.00
No. 2 hvy. melting	47.00 to 48.00
No. 1 factory bundles	64.00 to 65.00
No. 1 dealers' bundles	56.00 to 57.00
No. 2 dealers' bundles	41.00 to 42.00
Machine shop turn.	37.00 to 38.00
Mixed bor. and turn.	39.00 to 40.00
Shoveling turnings	39.00 to 40.00
Cast iron borings	39.00 to 40.00
Low phos. forge crops	69.00 to 70.00
Low phos. punch'gs plate	66.00 to 68.00
Low phos. 3 ft and under	65.00 to 66.00
No. 1 RR. hvy. melting	64.00 to 66.00
Scrap rails, random lgth.	73.00 to 74.00
Rerolling rails	84.00 to 85.00
Rails 2 ft and under	83.00 to 84.00
Locomotive tires, cut	69.00 to 70.00
Cut bolsters & side frames	69.00 to 70.00
Angles and splice bars	74.00 to 75.00
RR. steel car axles	87.00 to 88.00
RR. couplers and knuckles	68.00 to 69.00
No. 1 machine Cast.	56.00 to 57.00
Cupola Cast.	51.00 to 52.00
Heavy breakable cast.	45.00 to 46.00
Cast iron brake shoe	47.00 to 48.00
Cast iron wheel	56.00 to 57.00
Malleable	69.00 to 70.00
Stove plate	47.00 to 48.00
Steel car wheels	68.00 to 69.00

Philadelphia Area

No. 1 hvy. melting	$56.00 to $57.00
No. 2 hvy. melting	47.00 to 48.00
No. 1 bundles	56.00 to 57.00
No. 2 bundles	45.00 to 46.00
Machine shop turn.	40.00 to 41.00
Mixed bor. short turn.	40.00 to 41.00
Cast iron borings	40.00 to 41.00
Shoveling turnings	44.00 to 45.00
Clean cast chem. borings	46.00 to 47.00
Low phos. 5 ft and under	61.00 to 62.00
Low phos. 2 ft and under	62.00 to 63.00
Low phos. punch'gs	62.00 to 63.00
Elec. furnace bundles	60.00 to 61.00
Heavy turnings	52.00 to 53.00
RR. steel wheels	69.00 to 70.00
RR. spring steel	69.00 to 70.00
Rails 18 in. and under	76.00 to 77.00
Cupola cast.	52.00 to 54.00
Heavy breakable cast	55.00 to 57.00
Cast iron car wheels	64.00 to 65.00
Malleable	68.00 to 69.00
Unstripped motor blocks	44.00 to 45.00
No. 1 machinery cast.	57.00 to 59.00

Cleveland

No. 1 hvy. melting	$62.00 to $63.00
No. 2 hvy. melting	46.00 to 47.00
No. 1 bundles	62.00 to 63.00
No. 2 bundles	39.00 to 40.00
No. 1 busheling	62.00 to 63.00
Machine shop turn.	33.00 to 34.00
Mixed bor. and turn.	37.00 to 38.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	37.00 to 38.00
Cut struct'r'l & plates, 2 ft & under	64.50 to 65.50
Drop forge flashings	62.50 to 63.50
Low phos. punch'gs, plate	63.00 to 64.00
Foundry steel, 2 ft & under	56.00 to 57.00
No. 1 RR. heavy melting	65.00 to 66.00
Rails 2 ft and under	82.00 to 83.00
Rails 18 in. and under	83.00 to 84.00
Railroad grate bars	47.00 to 48.00
Steel axle turnings	43.00 to 44.00
Railroad cast.	60.00 to 61.00
No. 1 machinery cast.	57.00 to 58.00
Stove plate	54.00 to 55.00
Malleable	70.00 to 71.00

Youngstown

No. 1 hvy. melting	$63.00 to $64.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 bundles	63.00 to 64.00
No. 2 bundles	45.00 to 46.00
Machine shop turn.	34.00 to 35.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	40.00 to 41.00
Low phos. plate	64.00 to 65.00

Buffalo

No. 1 hvy melting	$54.00 to $55.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 busheling	54.00 to 55.00
No. 1 bundles	54.00 to 55.00
No. 2 bundles	42.00 to 43.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	32.00 to 33.00
Low phos. plate	59.00 to 60.00
Scrap rails, random lgth.	57.00 to 58.00
Rails 2 ft and under	77.00 to 78.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	70.00 to 71.00
No. 1 machinery cast.	52.00 to 53.00
No. 1 cupola cast.	48.00 to 49.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$55.00 to $56.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles, openhearth	56.00 to 57.00
No. 2 bundles	35.00 to 36.00
New busheling	55.00 to 56.00
Drop forge flashings	54.50 to 55.50
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	32.00 to 33.00
Low phos. punch'gs, plate	55.00 to 56.00
No. 1 cupola cast.	51.00 to 52.00
Heavy breakable cast.	44.00 to 45.00
Stove plate	45.00 to 46.00
Automotive cast.	54.00 to 55.00

St. Louis

No. 1 hvy. melting	$52.00 to $53.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 bundles	55.00 to 56.00
No. 2 bundles	41.00 to 42.00
Machine shop turn	33.00 to 34.00
Cast iron borings	35.00 to 36.00
Shoveling turnings	35.00 to 36.00
No. 1 RR. hvy. melting	62.50 to 63.50
Rails, random lengths	73.00 to 74.00
Rails 18 in. and under	79.00 to 80.00
Locomotive tires uncut	64.00 to 65.00
Angles and splice bars	68.00 to 69.00
Std. steel car axles	78.00 to 79.00
RR. specialties	66.50 to 67.50
Cupola cast.	52.00 to 53.00
Heavy breakable cast.	43.00 to 44.00
Cast iron brake shoes	50.00 to 51.00
Stove plate	44.00 to 45.00
Cast iron car wheels	53.00 to 54.00
Rerolling rails	84.00 to 85.00
Unstripped motor blocks	43.00 to 44.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$48.00 to $49.00
No. 2 hvy. melting	37.00 to 37.50
No. 1 bundles	48.00 to 49.00
No. 2 bundles	35.00 to 35.50
No. 1 busheling	48.00 to 49.00
Elec. furnace, 3 ft & under	51.00 to 52.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and short turn.	31.00 to 32.00
Shoveling turnings	32.00 to 33.00
Clean cast chem. borings	34.00 to 35.00
No. 1 machinery cast.	45.00 to 46.00
Mixed cupola cast.	40.00 to 41.00
Heavy breakable cast.	44.00 to 45.00
Stove plate	39.00 to 40.00
Unstripped motor blocks	32.00 to 33.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	42.00 to 43.00
No. 2 bundles	38.00 to 39.00
Machine shop turn.	31.00 to 32.00
Mixed bor. and turn.	31.00 to 32.00
Shoveling turnings	37.00 to 38.00
Clean cast chem. borings	35.00 to 36.00
No. 1 machinery cast.	51.00 to 52.00
Mixed yard cast.	47.00 to 48.00
Charging box cast.	47.00 to 48.00
Heavy breakable cast.	47.00 to 48.00
Unstripped motor blocks	37.00 to 38.00

Birmingham

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	42.00 to 43.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	33.00 to 34.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	25.00 to 26.00
Electric furnace bundles	52.00 to 53.00
Bar crops and plate	59.00 to 60.00
Structural and plate, 2 ft	57.00 to 58.00
No. 1 RR. hvy. melting	56.00 to 57.00
Scrap rails, random lgth.	69.00 to 70.00
Rails, 18 in. and under	74.00 to 75.00
Angles & splice bars	68.00 to 69.00
Rerolling rails	77.00 to 78.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	51.00 to 52.00
Charging box cast.	40.00 to 41.00
Cast iron car wheels	45.00 to 46.00
Unstripped motor blocks	46.00 to 47.00
Mashed tin cans	15.00 to 16.00
Elec. furnace, 3 ft & under	50.00 to 51.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$56.00 to $57.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 bundles	56.00 to 57.00
No. 2 bundles	41.00 to 42.00
Machine shop turn.	36.00 to 37.00
Mixed bor. and turn.	36.50 to 37.50
Shoveling turnings	38.50 to 39.50
Cast iron borings	36.00 to 37.00
Low phos. 18 in. & under	61.00 to 62.00
Rails, random lengths	69.00 to 70.00
Rails, 18 in. and under	76.00 to 77.00
No. 1 cupola cast.	48.00 to 49.00
Hvy. breakable cast.	47.00 to 48.00
Drop broken cast.	58.00 to 59.00

San Francisco

No. 1 hvy. melting	....	$55.00
No. 2 hvy. melting	....	52.00
No. 1 bundles	....	53.00
No. 2 bundles	....	43.00
Machine shop turn.	....	35.00
Cast iron borings	....	35.00
No. 1 RR. hvy. melting	....	55.00
No. 1 cupola cast.	....	60.00

Los Angeles

No. 1 hvy. melting	....	$57.00
No. 2 hvy. melting	....	54.00
No. 1 bundles	....	55.00
No. 2 bundles	....	44.00
Machine shop turn.	....	35.00
Shoveling turnings	....	38.00
Cast iron borings	....	35.00
Elec. furn. 1 ft and under (foundry)	....	66.00
No. 1 RR. hvy. melting	....	57.00
No. 1 cupola cast.	....	60.00

Seattle

No. 1 hvy. melting	....	$55.00
No. 2 hvy. melting	....	52.00
No. 2 bundles	....	33.00
No. 1 cupola cast.	....	55.00
Mixed yard cast.	....	55.00

Hamilton, Ont.

No. 1 hvy. melting	....	$52.00
No. 2 hvy. melting	....	47.00
No. 1 bundles	....	52.00
No. 2 bundles	....	40.50
Mixed steel scrap	....	46.00
Bushellings	....	39.50
Bush., new fact., prep'd.	....	50.00
Bush., new fact., unprep'd	....	46.00
Machine shop turn.	....	31.00
Short steel turn.	....	35.00
Mixed bor. and turn.	....	28.00
Rails, rerolling	....	60.00
Cast scrap	....	50.00

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Orders Disappoint Brass Mills

Expected autumnal sales spurt has not come . . . Lack of volume orders from Detroit called main reason . . . But mills insist volume is fair . . . No Crisis expected.

◆ EASTERN BRASS mills are not satisfied with current conditions. Expected fall upturn in orders has not yet materialized to any substantial degree. Particularly disappointing has been the low order volume from automakers. But no market, with the possible exception of electrical equipment, can be described as really hot.

Some mills have fallen back on layoffs to preserve the basic 40-hour week. Others have cut work weeks to prevent layoffs.

But there is no real crisis—and none is expected. "I can't call volume from any market really poor," comments one top executive.

Underlying weakness of the whole market is the present copper price situation. Brass mill prices historically fluctuate in harmony with copper price changes. And copper prices are uneasy right now.

European copper is cheaper than American metal. And the British Government's plans to sell 36,000 tons in first quarter will not strengthen the price situation.

Domestic custom smelters early last week cut prices 4¢, to 35¢ per lb, and brass and bronze ingot makers have followed suit.

Copper scrap buying prices have also been dropped, opening the door for further secondary metal price cuts in the future. Domestic primary copper is still firmly priced at 40¢ per lb.

Trade observers see no reason for brass mill prices not to maintain their traditional pattern and follow copper prices. Hence mill customers are currently reluctant to increase inventories in the face of possible copper price reductions.

Officially, Detroit is waiting for public reaction to new models before jumping into heavy commitments. But brass industry executives comment privately that they believe automakers are trying to spread production, avoid peaks and valleys. SUB obligations are cited as a major spur to such "slower but steadier" output policies. Some believe that if the new policies firm into a major auto buying pattern "Detroit's suppliers will become, in effect, warehousers of auto components.

Construction has been another disappointment to the brass mills. Some seasonal fall-off was expected, but third quarter's poor showing has proved an unforeseen embarrassment.

With winter so close, the mills see little chance for order pick-up in this market until second quarter.

Brass mills refuse to panic. Business is still at fair volume, and any drop below current levels doesn't seem to be in the cards right now. Conversely, a sharp pick-up in orders from major market segments could come almost over night. Swift public acceptance of Detroit's new offerings, expected by many, could bring auto orders in torrents. And copper price clarification, if and when it comes, is sure to mean a hefty spurt in demand from all markets.

TIN . . . Market was easier this week with a fair amount of trading. Tin price dropped slightly on both the domestic market and London Metal Exchange. This is a reflection of a reduced price at Singapore and not a suggestion of settlement of the Suez issue. The drop did not put the price near what it would be if based only on world supply and demand.

The work of establishing the International Tin Agreement as an efficiently functioning unit proceeded as Italy became the 11th consuming nation to deposit the ratified agreement with the foreign office in London, as required. However, even if progress speeded up and the organization was put on a working basis immediately, it could not hope to cope with situations like Suez. Its power lies primarily in its ability to buy and sell tin on world markets.

ALUMINUM . . . The Aluminum Assn. reports that primary aluminum production during September practically doubled August output 264,631,718 lbs from 184,812,424 lbs. This also topped the 261,231,951 lb. turned out September last year.

COPPER . . . The Copper Institute reports primary production both domestic and world wide was off in September from the previous month. U. S. output dropped from 91,282 tons to 88,885 tons, and output outside this country dropped from 150,013 tons to 133,981 tons.

However, foreign markets were not in agreement with domestic on deliveries to fabricators. Domestic deliveries dropped from 109,618 tons during August to 104,486 tons in September, while outside the U. S. deliveries for September rose to 116,222 tons from 114,928 in August.

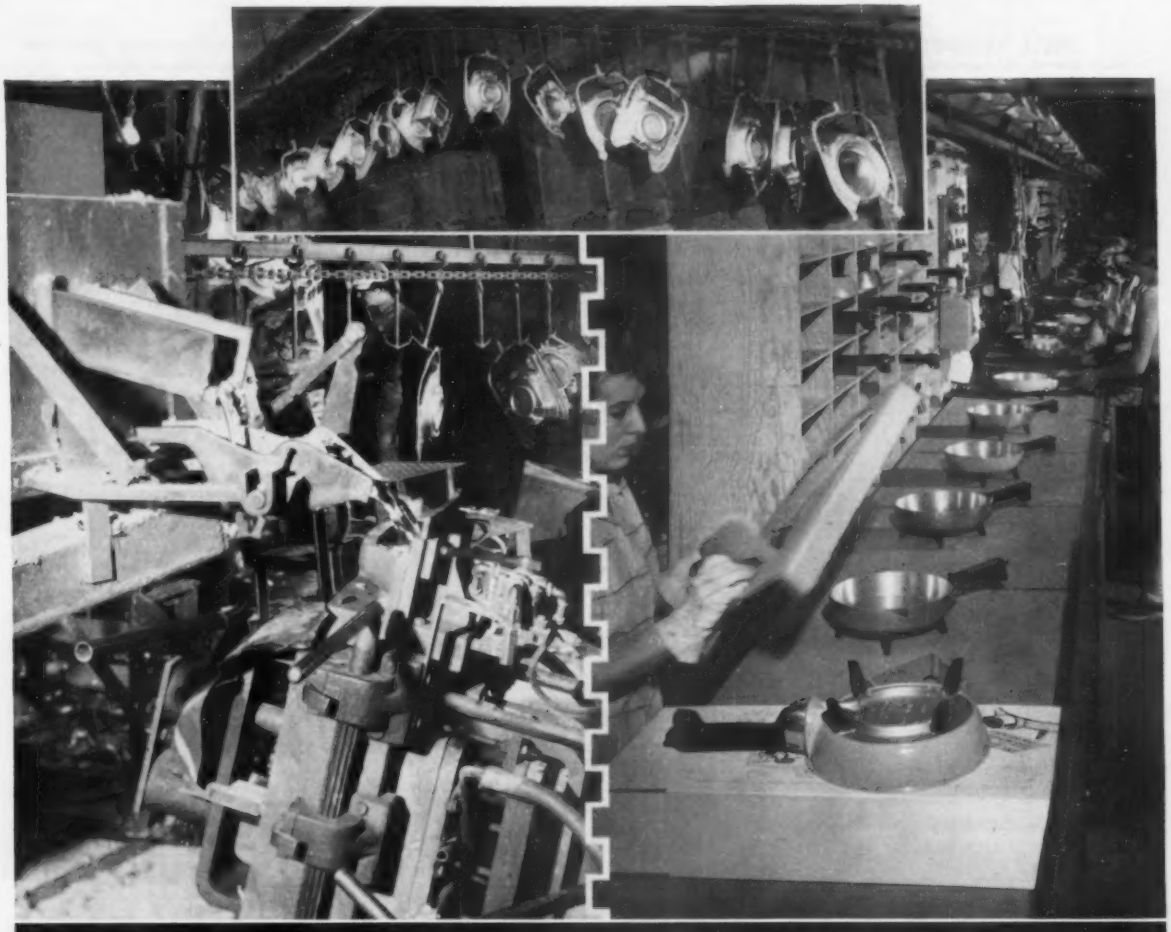
Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Oct. 17	Oct. 18	Oct. 19	Oct. 20	Oct. 22	Oct. 23
Copper, electro, Conn.	40.00	40.00	40.00	40.00	40.00	40.00
Copper, Lake, delivered	40.00	40.00	40.00	40.00	40.00	40.00
Tin, Straits, New York	107.00	106.75	106.25	....	107.00	107.25*
Zinc, East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices. **Tentative*

MONARCAST* ALUMINUM PERMANENT MOLD PRODUCTION IS GEARED TO MASS-ASSEMBLY LINE DEMANDS



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Nonferrous Prices *(Effective Oct. 23, 1956)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–3.
1800, 1100, 3003	44.3	42.1	40.9	40.2
5052	51.8	46.8	45.1	42.9
6061–0	48.9	44.6	42.8	42.6

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6– 8	45.5–47.3	61.3–65.1
12–14	46.2–47.7	62.2–66.8
24–26	49.4–49.5	73.1–77.8
36–38	58.3–59.0	97.4–101.0

Screw Machine Stock—2011-T-3

Size*	¾	⅞–1⅛	1¼–1½	1¾–1½
Price	59.7	58.8	57.4	55.2

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.352	$1.803	$2.254	$2.704
.024 gage	1.686	2.252	2.815	3.378

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type→ Gage→	.250–3.00	.250–2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	95.7	108.7	171. 3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	113	97	118
Strip, CR	111	99	128
Rod, bar, HR	94	80	99
Angles, HR	94	80	99
Plates, HR	107	96	111
Seamless tube	144	120	190
Shot, blocks	...	78	...

COPPER, BRASS, BRONZE

(Freight included on 500 lbs)

	Sheet	Wire	Rod	Tube
Copper	61.63	.....	.....	61.82
Brass, 70/30	52.10	52.64	.....	55.01
Brass, Low	55.85	56.39	55.75	58.66
Brass, R L	57.19	57.73	57.13	60.00
Brass, Naval	55.72	.....	50.03	58.88
Munts Metal	53.84	47.85	49.65	.....
Comm. Bs.	59.08	59.62	59.02	61.64
Mang. Bs.	50.46	.....	53.56	.....
Phos. Bs. 5%	79.58	.....	80.08	.....

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $12.10-$12.60; alloy, $15.00-$15.75; Plate, HR, commercially pure, $10.00-$10.50; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.00-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.55-$7.80; alloy, $7.55-$7.75.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb. freight allowed $27.10
Aluminum pig 25.00
Antimony, American, Laredo, Tex. 33.50
Beryllium copper, per lb conta'd Be. $43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be $74.75
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Cobalt, 97-99% (per lb) ... $2.60 to $2.67
Copper, electro, Conn. Valley 40.00
Copper, Lake, delivered 40.00
Gold, U. S. Treas., per troy oz. ... $35.00
Indium, 99.9% dollars per troy oz. $ 2.25
Iridium, dollars per troy oz. ... $90 to $100
Lead, St. Louis 15.80
Lead, New York 16.00
Magnesium, 99.8+%, f.o.b. Velasco, Tex., 10,000 lb, pig 35.25
ingot 36.00
Magnesium, sticks, 100 to 500 lb. ... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $255 to $257
Nickel electro 64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 60.75
Palladium, dollars per troy oz. ... $22 to $24
Platinum, dollars per troy oz. $103 to $105
Silver, New York, cents per troy oz. 91.375
Tin, New York 107.25*
Titanium sponge, grade A-1, $2.70 to $3.00
Zinc, East St. Louis 13.50
Zinc, New York 14.00
Zirconium sponge $10.00
*Tentative.

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 35.00
No. 120 ..... 33.75
No. 123 ..... 32.25
80-10-10 ingot
No. 305 ..... 33.50
No. 315 ..... 36.75
88-10-2 ingot
No. 210 ..... 48.75
No. 215 ..... 44.50
No. 245 ..... 40.00
Yellow ingot
No. 405 ..... 27.50
Manganese bronze
No. 421 ..... 30.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 27.00-27.75
0.60 copper max. 26.75-27.50
Piston alloys (No. 122 type) .. 26.50-27.50
No. 12 alum. (No. 2 grade) 25.00-25.50
108 alloy 25.00-25.50
195 alloy 27.00-28.00
13 alloy (0.60 copper max.) ... 26.75-27.50
AXS-679 ..... 25.00-25.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 25.00-26.00
Grade 2—92-95% 24.00-25.00
Grade 3—90-92% 23.50-24.50
Grade 4—85-90% 23.00-23.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	36	35¼
Yellow brass	27¼	25⅛
Red brass	31⅞	31⅛
Comm. bronze	33⅛	32⅝
Mang. bronze	25¼	24½
Yellow brass rod ends	27	....

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 29
No. 2 copper wire 27½
Light copper 25¼
*Refinery brass 25½
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 29
No. 2 copper wire 27½
Light copper 25¼
No. 1 composition 27¾
No. 1 comp. turnings 26¼
Hvy. yellow brass solids 18¾
Brass pipe 19¼
Radiators 21¼

Aluminum

Mixed old cast. ..... 16½—17½
Mixed new clips ..... 17½—18½
Mixed turnings, dry ..... 16½—17½

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	26	—26½
No. 2 copper wire	24	—25
Light copper	22	—22½
Auto radiators (unsweated)	18	—18½
No. 1 composition	24½	—25
No. 1 composition turnings	23	—23½
Cocks and faucets	18½	—19
Clean heavy yellow brass	16	—16½
Brass pipe	20	—20½
New soft brass clippings	21	—21½
No. 1 brass rod turnings	18½	—19

Aluminum

Alum. pistons and struts	7	— 7½
Aluminum crankcases	12	—12½
1100 (2S) aluminum clippings	15	—15½
Old sheet and utensils	12	—12½
Borings and turnings	8½	— 9
Industrial castings	12	—12½
2024 (24S) clippings	13½	—14

Zinc

New zinc clippings	7	— 7⅛
Old zinc	4½	— 5
Zinc routings	2¾	— 3
Old die cast scrap	2½	— 2¾

Nickel and Monel

Pure nickel clippings	$1.85-$1.95
Clean nickel turnings	$1.55-$1.65
Nickel anodes	$1.85-$1.95
Nickel rod ends	$1.85-$1.95
New Monel clippings	80-90
Clean Monel turnings	70-80
Old sheet Monel	70-80
Nickel silver clippings, mixed	21
Nickel silver turnings, mixed	18

Lead

Soft scrap lead	12½—13
Battery plates (dry)	7 — 7¼
Batteries, acid free	4½

Miscellaneous

Block tin	80 —81
No. 1 pewter	62½—63
Auto babbitt	42 —42½
Mixed common babbitt	13 —13½
Solder joints	18 —18½
Siphon tops	42
Small foundry type	15¼—15½
Monotype	14½—15
Lino. and stereotype	13 —13¼
Electrotype	12½—12¾
Hand picked type shells	10 —10½
Lino. and stereo. dross	5¼— 5¾
Electro. dross	4¼— 4½

IRON AGE

STEEL PRICES

(Effective Oct. 23, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$107.00 *B3*		5.05 *B3*	7.40 *B3*	5.05 *B3*						
	Buffalo, N. Y.	$74.00 *B3, R3*	$91.50 *B3, R3*	$107.00 *B3, R3*	5.90 *B3*	5.05 *B3*	7.40 *B3*	5.05 *B3*	4.675 *B3, R3*	6.95 *R7*	6.95 *B3*			
	Claymont, Del.													
	Harrison, N. J.													14.55 *C11*
	Conshohocken, Pa.		$96.50 *A2*	$114.00 *A2*					4.725 *A2*	6.90 *A2*	6.95 *A2*			
	New Bedford, Mass.									7.30 *R6*				
	Johnstown, Pa.	$74.00 *B3*	$91.50 *B3*	$107.00 *B3*		5.05 *B3*	7.40 *B3*							
	Boston, Mass.									7.40 *T8*				14.90 *T8*
	New Haven, Conn.									7.30 *D1*				
	Baltimore, Md.									6.85 *T8*				
	Phoenixville, Pa.					5.85 *P2*		5.85 *P2*						
	Sparrows Pt., Md.								4.675 *B3*		6.95 *B3*			
	Bridgeport, Wallingford, Conn.	$79.00 *N8*	$96.50 *N8*	$107.00 *N8*						7.30 *W1* 6.95 *T8*				
	Pawtucket, R. I. Worcester, Mass.									7.40 *A5,N7*				14.90 *N7*
MIDDLE WEST	Alton, Ill.								4.675 *L1*					
	Ashland, Ky.								4.675 *A7*					
	Canton-Massillon, Dover, Ohio		$94.00 *R3*	$107.00 *R3 T5*						6.85 *G4*		10.10 *G4*		14.55 *G4*
	Chicago, Ill. Franklin Park, Ill.	$74.00 *U1, R3*	$91.50 *U1, R3,W8*	$107.00 *U1, R3,W8*	5.90 *U1*	5.00 *U1, W8*	7.35 *U1, Y1* 6.00 *W8*	5.00 *U1*	4.675 *N4* 4.675 *A1*	6.95 *A1,T8*			7.75 *W8, S9*	14.55 *A1, S9,T8*
	Cleveland, Ohio									6.85 *A5,J5*			7.75 *J5*	
	Detroit, Mich.	$74.00 *R5*		$107.00 *R5*					4.775 *G3, M3*	6.95 *M2,G3, D2,P11*	7.05 *G3*	10.10 *G3, S1,D2*	7.05 *G3*	
	Anderson, Ind.									6.85 *G4*		10.10 *G4*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$74.00 *U1*	$91.50 *U1*	$107.00 *U1, Y1*	5.90 *I3*	5.00 *U1*	7.35 *U1,I3*	5.00 *I3*	4.675 *U1, I3,Y1*	6.85 *Y1*	6.95 *U1, I3,Y1*	10.20 *Y1*	7.75 *U1, Y1*	
	Sterling, Ill.	$74.00 *N4*							4.775 *N4*					
	Indianapolis, Ind.									7.00 *C9*				
	Newport, Ky.												7.75 *N5*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$91.50 *S1, C10*	$107.00 *S1 C10*					4.675 *S1, R3*	6.85 *T4*	6.95 *S1, R3*	10.00 *S1, R3*	7.75 *S1*	14.55 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$74.00 *U1, J3*	$91.50 *U1, J3, C11*	$107.00 *U1, C11*	5.90 *U1*	5.00 *U1, J3*	7.35 *U1, J3*	5.00 *U1*	4.675 *P8*	6.85 *P8* 6.85 *J3,B4, S7*			7.75 *S9*	14.55 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					5.00 *W3*			4.675 *W3*	6.85 *W3,F3*	6.95 *W3*	9.85 *W3*		
	Youngstown, Ohio	$74.00 *R3*	$91.50 *Y1, C10*	$107.00 *Y1*		5.00 *Y1*	7.35 *Y1*		4.675 *U1, Y1*	6.85 *Y1,C9*	6.95 *U1, Y1*	10.20 *Y1*	7.75 *U1, Y1*	
WEST	Fontana, Cal.	$83.50 *K1*	$101.00 *K1*	$128.00 *K1*		5.70 *K1*	8.85 *K1*	5.85 *K1*	5.475 *K1*	6.85 *K1*				
	Geneva, Utah	$91.50 *C7*				5.00 *C7*	7.35 *C7*							
	Kansas City, Mo.					5.10 *S2*	7.45 *S2*		4.925 *S3*		7.20 *S2*			
	Los Angeles, Torrance, Cal.		$101.00 *B2*	$127.00 *B2*		5.70 *C7, B2*	8.85 *B2*		5.425 *B2 C7*	8.80 *C1*			8.95 *B2*	
	Minnequa, Colo.					5.30 *C6*			5.175 *C9*					
	Portland, Ore.					5.75 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$101.00 *B2*			5.65 *B2*	8.06 *B2*		5.425 *C7, B2*					
	Seattle, Wash.		$105.00 *B2*			5.75 *B2*	8.16 *B2*		5.675 *B2*					
SOUTH	Atlanta, Ga.								4.675 *A9*					
	Fairfield, Ala. City, Birmingham, Ala.	$74.00 *T2*	$91.50 *T2*			5.00 *T2, R3* 5.30 *C16*	7.35 *T2*		4.675 *T2, R3* 4.875 *C16*		6.95 *T2*			
	Houston, Lone Star, Texas	$80.00 *L3*	$96.50 *S2*	$112.00 *S2*		5.10 *S2*	7.45 *S2*		4.925 *S2*		7.20 *S2*			

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		SHEETS										WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.			Coke* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Bethlehem, Pa.											5.80 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Buffalo, N. Y.	4.675 *B3*	5.75 *B3*				6.90 *B3*	8.525 *B3*							
	Claymont, Del.														
	Coatesville, Pa.														
	Conshohocken, Pa.	4.725 *A2*	5.80 *A2*				6.95 *A2*								
	Harrisburg, Pa.														
	Hartford, Conn.														
	Johnstown, Pa.											5.80 *B3*			
	Fairless, Pa.	4.725 *U1*	5.80 *U1*				6.95 *U1*	8.575 *U1*					$9.70 *U1*	$8.40 *U1*	
	New Haven, Conn.														
	Phoenixville, Pa.														
	Sparrows Pt., Md.	4.675 *B3*	5.75 *B3*	6.30 *B3*			6.90 *B3*	8.575 *B3*	9.275 *B3*			5.90 *B3*	$9.70 *B3*		
	Worcester, Mass.											6.10 *A5*			
	Trenton, N. J.														
MIDDLE WEST	Alton, Ill.											6.00 *L1*			
	Ashland, Ky.	4.675 *A7*		6.30 *A7*	6.325 *A7*										
	Canton-Massillon, Dover, Ohio			6.30 *R3,R1*											
	Chicago, Joliet, Ill.	4.675 *W8, A1*					6.90 *U1*			5.80 *K2*		5.80 *A5,R3, N4,W8,K3*			
	Sterling, Ill.											5.90 *N4,K2*			
	Cleveland, Ohio	4.675 *J3, R3*	5.75 *J3, R3*		6.325 *R3*		6.90 *R3*	8.525 *R3, J3*				5.80 *A5*			
	Detroit, Mich.	4.775 *G3, M2*	5.95 *G3* 5.75 *M2*				7.00 *G2*	8.625 *G3*							
	Newport, Ky.	4.675 *N5*	5.75 *N5*												
	Gary, Ind. Harbor, Indiana	4.675 *U1, I3,Y1*	5.75 *U1, I3,Y1*	6.30 *U1, I3*	6.325 *U1, I3,Y1*	6.70 *U1*	6.90 *U1, Y1,I3*	8.525 *U1, Y1*				5.80 *Y1*	$9.60 *U1, Y1*	$8.30 *I3, U1,Y1*	7.15 *U1, Y1*
	Granite City, Ill.	4.875 *G2*	5.95 *G2*	6.50 *G2*	6.525 *G2*									$8.40 *G2*	7.25 *G2*
	Kokomo, Ind.			6.40 *C9*								5.90 *C9*			
	Mansfield, Ohio		5.75 *E2*			6.70 *E2*									
	Middletown, Ohio		5.75 *A7*	6.30 *A7*	6.325 *A7*	6.70 *A7*									
	Niles, Warren, Ohio Sharon, Pa.	4.675 *S1, R3, N3*	5.75 *R3*	6.30 *R3*	6.325 *N3*	6.70 *N3*	6.90 *S1, R3*	8.525 *S1, R3*						6.30 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 *U1, J3,P6*	5.75 *U1, J3,P6*	6.30 *U1, J3*	6.325 *U1*		6.90 *U1, J3,R3*	8.525 *U1, J3*	9.275 *U1*			5.80 *A5, P6,J3*	$9.60 *J3, U1*	$8.30 *U1*	7.15 *U1*
	Portsmouth, Ohio	4.675 *P7*	5.75 *P7*									5.80 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.675 *W3, W5*	5.75 *W3, W5,F3*	6.30 *W3, W5*		6.70 *W3, W5*	6.90 *W3*	8.525 *W3*					$9.60 *W5*	$8.30 *W5*	7.15 *W5* 7.40 *W3*
	Youngstown, Ohio	4.675 *U1, Y1*	5.75 *Y1*		6.325 *Y1*		6.90 *Y1*	8.525 *Y1*				5.80 *Y1*			7.15 *Y1*
WEST	Fontana, Cal.	5.475 *K1*	6.95 *K1*				7.70 *K1*	9.725 *K1*					$10.35 *K1*	$9.05 *K1*	
	Geneva, Utah	4.775 *C7*													
	Kansas City, Mo.											6.05 *S2*			
	Los Angeles, Torrance, Cal.											6.60 *B2*			
	Minnequa, Colo.											6.05 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.375 *C7*	6.70 *C7*	7.05 *C7*								6.45 *C7*	$10.35 *C7*	$9.05 *C7*	
	Seattle, Wash.														
SOUTH	Atlanta, Ga.														
	Fairfield, Ala. Alabama City, Ala.	4.675 *T2, R3*	5.75 *T2*	6.30 *T2, R3*								5.80 *T2,R3*	$9.70 *T2*	$8.40 *T2*	
	Houston, Tex.											6.05 *S2*			

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem				6.125 *B3*	8.325 *B3*	7.40 *B3*					
	Buffalo, N. Y.	5.075 *B3,R3*	5.075 *B3,R3*	6.90 *B5*	6.125 *B3,R3*	8.325 *B5,B3*	7.40 *B3*	4.85 *B3*				7.20 *W6*
	Claymont, Del.							5.35 *C4*		6.85 *C4*	7.55 *C4*	
	Centerville, Pa.							5.25 *L4*		6.85 *L4*	7.55 *L4*	
	Conshohocken, Pa.							4.90 *A2*	5.925 *A2*	6.25 *A2*	7.25 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *C3*			
	Hartford, Conn.			7.35 *R3*		8.625 *R3*	7.40 *B3*					
	Johnstown, Pa.	5.075 *B3*	5.075 *B3*		6.125 *B3*			4.85 *B3*		6.85 *B3*	7.25 *B3*	7.20 *B3*
	Fairless, Pa.	5.225 *U1*	5.225 *U1*		6.275 *U1*							
	Newark, N. J.			7.30 *W10*		8.50 *W10*						
	Camden, N. J.			7.30 *P10*		8.50 *P10*						
	Bridgeport, Conn.	5.30 *N8*	5.30 *N8*	7.20 *N8* 7.40 *W10*	6.20 *N8*	8.475 *N8*	7.50 *N8*					
	Sparrows Pt., Md.		5.675 *B3*					4.85 *B3*		6.85 *B3*	6.85 *B3*	7.30 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Pa.	5.225 *M7*	5.225 *M7*	7.40 *B5,C14*		8.325 *A5* 8.625 *B5*						7.50 *A5,W6* 9.825 *T8*
	Spring City, Pa.			7.30 *K4*		8.50 *K4*						
MIDDLE WEST	Alton, Ill.	5.275 *L1*										7.60 *L1*
	Ashland, Newport, Ky.							4.85 *A7,N5*		6.85 *N5*		
	Canton-Massillon, Ohio			6.85 *R3,R2*	6.125 *R3,T5*	8.325 *R3,R2,T5*						
	Chicago, Joliet, Ill.	5.075 *U1,R3,W8,N4* 5.575 *P13*	5.075 *U1,R3,N4* 5.575 *P13*	6.85 *A5,B5,W10,L2,W8, L2, N9*	6.125 *U1,R3,W8*	8.325 *A5,B5,W8,L2,N9,W10*	5.075 *W8*	4.85 *U1,I3,W8,A1*	5.925 *U1*	6.85 *U1,W8*	7.25 *U1*	7.20 *A5, K2, R3,N4,W7*
	Cleveland, Ohio	5.075 *R3*	5.075 *R3*	6.85 *A5,C13*		8.325 *A5,C13*	7.425 *R3*	4.95 *J3,R3*	5.925 *J3*		7.25 *J3,R3*	7.20 *A5, C13*
	Detroit, Mich.	5.175 *G3*	5.425 *G3*	7.05 *B5,P8* 7.10 *P3* 6.85 *R5*	6.225 *G3* 6.125 *R5*	8.525 *B5,P3, P8* 8.325 *R5*	7.525 *G3*	4.95 *G3*		6.90 *G3*		
	Duluth, Minn.											7.20 *A5*
	Gary, Ind. Harbor, Crawfordsville	5.075 *U1,I3, Y1*	5.075 *U1,I3, Y1*	6.85 *R3,M5*	6.125 *U1,I3, Y1*	8.325 *R3,M4*	7.425 *U1,I3, Y1*	4.85 *U1,I3, Y1*	5.925 *I3*	6.85 *U1, Y1*	7.25 *U1, Y1*	7.30 *M4*
	Granite City, Ill.							5.05 *G2*				
	Kokomo, Ind.											7.30 *C9*
	Sterling, Ill.	5.525 *N4*	5.175 *N4*									7.30 *K2*
	Niles, Warren, Ohio Sharon, Pa.			6.85 *C11*	6.125 *C10,S1*	8.325 *C10*	7.425 *S1*	4.85 *S1,R3*		6.85 *S1*	7.25 *S1,R3*	
	Pittsburgh, Pa. Midland, Pa.	5.075 *U1, C11,J3*	5.075 *U1,J3*	6.85 *A5,C8, C11,J3,R3, S9,B4,W10*	6.125 *U1,C11*	8.325 *A5,R3, S9,C8,W10*	7.425 *U1,J3*	4.85 *U1,J3*	5.925 *U1*	6.85 *U1,J3*	7.25 *U1,J3*	7.20 *A5,J3, P6*
	Portsmouth, Ohio											7.20 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							4.85 *W5*				
	Youngstown, Ohio	5.075 *U1, Y1,R3*	5.075 *U1, Y1,R3*	6.85 *U1,Y1, F2*	6.125 *U1,Y1*	8.325 *Y1,F2*	7.425 *U1,Y1*	4.85 *U1,Y1, R3*		6.85 *Y1*	7.25 *Y1*	7.20 *Y1*
WEST	Emeryville, Cal.	5.825 *J5*	5.825 *J5*									
	Fontana, Cal.	5.775 *K1*	5.775 *K1*		7.175 *K1*		8.125 *K1*	5.55 *K1*		7.55 *K1*	7.95 *K1*	
	Geneva, Utah	5.175 *C7*						4.85 *C7*			7.25 *C7*	
	Kansas City, Mo.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*					7.45 *S2*
	Los Angeles, Torrance, Cal.	5.775 *C7,B2*	5.775 *C7,B2*	8.30 *R3*	7.175 *B2*		8.125 *B2*					8.15 *B2*
	Minnequa, Colo.	5.525 *C6*	5.525 *C6*					5.70 *C6*				7.45 *C6*
	Portland, Ore.	5.825 *O2*	5.825 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.775 *C7,P9* 5.825 *B2*	5.775 *C7,P9* 5.825 *B2*				8.175 *B2*					8.15 *C7,C6*
	Seattle, Wash.	5.825 *B2* 5.825 *N6*	5.825 *B2*				8.175 *B2*	5.75 *B2*		7.75 *B2*	8.15 *B2*	
SOUTH	Atlanta, Ga.	5.575 *A8*										7.40 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.075 *T2, R3* 5.375 *C16*	5.075 *T2, R3* 5.375 *C16*				7.425 *T2*	4.85 *T2, R3*			7.25 *T2*	7.20 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.325 *S2*	5.325 *S2*		6.375 *S2*		7.675 *S2*	4.95 *S2* 5.20 *L3*		6.95 *S2*	7.35 *S2*	7.45 *S2*

Steel Prices *(Effective Oct. 23, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metals Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston Div., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Dearborn Div., Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	0.00	+15.25	3.00	+11.25	5.50	+7.75	8.00	+7.00	8.50	+6.00	9.00	+5.50	10.50	+5.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Alton, Ill. *L1*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Wheeling *W5*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
Indiana Harbor *Y1*	11.50	+5.75	14.50	1.25	17.00	3.75	19.50	4.50	20.00	5.50	20.50	6.00	22.00	5.75	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	4.50	.....	8.50	.....	10.50	.....	11.00	.....	11.50	.....	12.00	.....	12.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Alton, Ill. *L1*	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Wheeling *W5*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25
Indiana Harbor *Y1*	16.00	2.25	20.00	6.25	22.00	9.75	22.50	8.50	23.00	9.50	23.50	10.00	22.00	8.75	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½" and 3" pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts.] East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	—	1.845	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	2	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium	.83 D-3, D-5
Oil hardened manganese	.45 O-2
Special carbon	.41 W-1
Extra carbon	.345 W-1
Regular carbon	.29 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4*) 10 pct	Plate (*A3, J2, L4*) 15 pct	Plate (*A3, J2, L4*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	304	34.60	38.80	41.58	.....
	316	39.70	43.20	46.65	.....
	321	36.35	39.80	43.50	.....
	347	39.50	43.95	48.45	.....
	405	29.20	33.15	37.05	.....
	410, 430	28.70	32.65	36.55	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 41.40; 1 side, 33.60.

ELECTRICAL SHEETS

22-Gage F.a.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	9.00	9.20	.....
Armature	10.35	10.35	10.85
Elect.	11.00	11.025	11.525
Meter	12.05	12.075	12.575
Dynamo	13.05	13.05	13.55
Trans. 72	14.05	14.05	14.55
Trans. 65	14.60	Grain Oriented	
Trans. 58	15.10	Trans. 80	18.50
Trans. 52	16.15	Trans. 73	19.00

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*) (20¢ higher, HR); Zanesville, Butler (*A7*).

LAKE SUPERIOR ORES

51.50% *Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight charges for seller's account.*

	Gross Ton
Openhearth lump	$12.10
Old range, bessemer	11.25
Old range, nonbessemer	11.10
Mesabi, bessemer	11.00
Mesabi, nonbessemer	10.85
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated No 9 Cal	Woven Wire Fence Cal	Fence Posts Cal	Single Loop Bale Ties Cal	Galv. Barbed and Twisted Barbless Wire Cal	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	167	181	...	195	187	8.10	8.50
Aliquippa, Pa. *J3*	167	184	...	...	184	8.10	8.65
Atlanta *A8***	166	182	...	192	190	8.05	8.65
Bartonville *K2***	166	182	...	192	190	8.05	8.65
Buffalo *W6*	...	...	...	...	...	8.10	8.50
Chicago, Ill. *N4***	164	180	167	190	188	7.95	8.55
Cleveland *A6*	173	...	...	...	...	8.10	.....
Cleveland *A5*	...	...	...	...	...	7.95	.....
Crawfordsville *M4***	166	182	...	192	190	8.05	8.65
Donora, Pa. *A5*	164	176	...	190	184	7.95	8.35
Duluth *A5*	164	176	...	190	184	7.95	8.35
Fairfield, Ala. *T2*	164	176	...	190	184	7.95	8.35
Galveston *D4*	180‡	...	...	...	...	...	.....
Houston *S2*	169	181	...	195	189	8.20	8.60
Johnstown, Pa. *B3***	164	180	167	...	188	7.95	8.55
Joliet, Ill. *A5*	164	176	...	190	184	7.95	8.35
Kokomo, Ind. *C9*	169	183	...	197	189	8.20	8.60
Los Angeles *B2***	...	...	...	...	...	8.90	9.50
Kansas City *S2*	169	181	...	195	189	8.20	8.60
Minnequa *C6*†	169	181	...	195	189	8.20	8.60
Monessen *P6*	167	185	...	...	191	8.10	8.10
Pittsburg, Cal. *C7*	186	199	...	...	204	8.90	9.30
Portsmouth *P7*	...	...	...	...	...	8.10	.....
Rankin, Pa. *A5*	164	176	...	...	184	7.95	8.35
So. Chicago *R3*	167	181	...	195	187	8.10	8.50
S. San Francisco *C6*	...	...	...	219	...	9.05	9.45
Sparrows Pt. *B3***	166	...	...	192	190	8.05	8.65
Struthers, O. *Y1**	...	...	...	...	...	7.95	8.45
Worcester *A5*	170	...	...	...	...	8.25	8.65
Williamsport, Pa. *S5*	...	...	175	...	...	.....	.....

* Zinc less than .10¢. † Plus zinc extras.
** 13.5 zinc. ‡ Wholesalers only.

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery ‡ Charge	Sheets: Hot-Rolled 18 ga. & hvr.	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.07	9.27	9.83	8.16	.....	8.40	8.44	8.30	10.14	.....	.....	.....	.....
Baltimore	$.10	7.79	9.54	9.12	8.27	.....	8.12	8.57	8.34	9.09	14.99	14.44	18.39	18.99
Birmingham	.15	7.66	8.88	8.85	7.78	.....	8.01	8.05	7.91	10.04	.....	.....	.....	.....
Boston	.10	8.70–8.80	9.73–9.83	11.12	8.79–8.89	.....	8.98–9.08	8.90–9.00	8.88–8.98	10.71–10.81	15.05	14.45	18.51	18.10
Buffalo	.15	7.90	9.05	10.87	8.15	.....	8.40	8.40	8.15	8.85	15.00	14.45	18.40	.....
Chicago	.15	7.70–7.85	8.88–9.05	9.85	7.78–7.93	.....	8.01–8.16	8.05–8.20	7.91–8.06	8.35–8.50	14.65	14.10	18.05	17.75
Cincinnati	.15	7.97	9.04	9.90	8.21	.....	8.49	8.70	8.34	8.97	14.93	14.38	18.33	18.03
Cleveland	.15	7.83	9.03	9.75	8.03	.....	8.36	8.53	8.14	8.75	14.73	14.18	18.13	17.83
Denver		9.55	11.09	12.41	9.70	.....	9.80	9.60	9.75	10.54	.....	.....	.....	19.79
Detroit	.15	8.86	9.28	10.17	8.25	.....	8.48	8.70	8.33	8.83	.....	14.04	.....	17.09
Houston		8.70	9.65	.....	8.80	.....	8.60	8.90	8.95	10.55	15.50	.....	19.30	19.05
Kansas City	.20	8.52	9.72	10.07	8.60	.....	8.83	8.87	8.73	9.42	15.32	14.77	18.72	18.42
Los Angeles	.10	9.00	10.75	11.75	9.20	.....	9.45	9.05	8.90	11.80	15.85	15.35	19.70	19.45
Memphis	.15	8.02	9.22	.....	8.12	.....	8.35	8.39	8.25	9.85	.....	.....	.....	.....
Milwaukee	.15	7.97	9.17	9.97	8.05	.....	9.53	8.39	8.18	8.72	14.77	.....	18.17	17.87
New York	.10	8.45	9.63	10.33	8.91	.....	8.88	8.84	8.93	10.71	15.02	14.47	18.42	18.12
Norfolk	.20	8.00	.....	.....	8.40	.....	8.35	8.70	8.45	10.70	.....	.....	.....	.....
Philadelphia	.10	7.89–7.99	9.08–9.18	9.66–10.22	8.58–8.68	.....	8.28–8.38	8.38–8.48	8.37–8.47	9.12–9.22	14.80	14.15–14.25	18.20	17.90
Pittsburgh	.15	7.83	9.03	10.20	8.03**	.....	8.16	8.20	8.06	8.75	14.65	13.80–14.10	18.05	16.85–17.75
Portland		8.30	9.65	11.40	9.05	.....	8.70	8.90	8.95	13.55	16.70	16.10	20.40	20.25
San Francisco	.10	8.85	10.40	10.90	9.05	.....	8.95	8.95	8.90	12.40	15.85	15.35	19.70	19.45
Seattle		9.35	11.20	11.55	9.50	.....	9.05	9.15	9.30	13.15	16.10	15.55	19.50	19.20
St. Louis	.15	8.02–8.17	9.16–9.36†	10.03–10.18	8.11–8.26	.....	8.34–8.49	8.48–8.63	8.25–8.40	8.93–9.08	14.83–14.98	14.28	18.23–18.38	17.93
St. Paul	.15	8.44	9.64	10.46	8.54	.....	8.66	8.90	8.67	9.36	.....	14.62	.....	18.27

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
** F.O.B. Plant, warehouse price. † 16 gage. ‡ Deduct for country delivery.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Baltimore, Md. *T8*	8.25	10.10	12.90	15.30	18.25
Bristol, Conn. *W12*	...	...	12.90	15.30	18.25
Boston *T8*	8.50	10.10	12.90	15.30	18.25
Buffalo, N. Y. *R7*	7.95	9.80	12.60	15.00	17.95
Carnegie, Pa. *S9*	‡	9.80	12.60	15.00	.....
Cleveland *A5*	7.95	9.80	12.60	15.00	17.95
Detroit *D1*	8.05	9.90	12.70	15.10	.....
Detroit *D2*	8.05	9.90	12.70	.....	.....
Dover, O. *G4*	7.95	9.80	12.60	15.00	17.95
Franklin Park, Ill. *T8*	8.05	9.80	12.60	15.00	17.95
Harrison, N. J. *C11*	...	...	12.90	15.30	18.25
Indianapolis *C5*	8.10	9.95	12.60	15.00	17.95
New Castle, Pa. *B4*	7.95	9.80	12.60	15.00	.....
New Haven, Conn. *D1*	8.40	10.10	12.90	15.30	.....
Pawtucket, R. I. *N7*	8.50	10.10	12.90	15.30	18.25
Pittsburgh *S7*	7.95	9.80	12.60	15.00	17.95
Riverdale, Ill. *A1*	8.05	9.80	12.60	15.00	17.95
Sharon, Pa. *S1*	7.95	9.80	12.60	15.00	17.95
Trenton *R4*	...	10.10	12.90	15.30	18.25
Wallingford *W1*	8.40	10.10	12.90	15.30	18.15
Warren, Ohio *T4*	7.95	9.80	12.60	15.00	17.95
Weirton, W. Va. *W3*	7.95	9.80	12.60	15.00	17.95
Worcester, Mass. *A5*	8.50	10.10	12.90	15.30	18.25
Youngstown *C5*	7.95	9.80	12.60	15.00	17.95

‡ On Application.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	34.88	40.85	33.21	.....
	2½	12	46.98	55.01	44.73	.....
	3	12	54.24	63.53	51.66	.....
	3½	11	63.32	74.16	60.30	.....
	4	10	84.09	98.47	80.07	.....
National Tube	2	13	34.88	40.85	33.21	.....
	2½	12	46.98	55.01	33.73	.....
	3	12	54.24	63.53	51.66	.....
	3½	11	63.32	74.16	60.30	.....
	4	10	84.09	98.47	80.07	.....
Pittsburgh Steel	2	13	34.88	40.85	.....	.....
	2½	12	46.98	55.01	.....	.....
	3	12	54.24	63.53	.....	.....
	3½	11	63.32	74.16	.....	.....
	4	10	84.09	98.47	.....	.....

(Effective Oct. 23, 1956)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.075	6.00	6.35				
So. Chicago *R3*				8.775			
Ensley *T2*	5.075	6.00					
Fairfield *T2*		6.00		8.775		6.025	
Gary *U1*	5.075	6.00				6.025	
Ind. Harbor *I3*	5.075		6.35	8.775		6.025	
Ind. Harbor *Y1*				8.775			
Johnstown *B3*		6.00					
Joliet *U1*	5.075		6.35				
Kansas City *S2*				8.775			
Lackawanna *B3*	5.075	6.00	6.35			6.025	
Lebanon *B3*							13.10
Minnequa *C6*	5.075	6.50	6.35	8.775		6.025	13.10
Pittsburgh *P5*				8.775	12.85		
Pittsburgh *J3*				8.775			13.10
Seattle *B2*				9.275		6.175	13.16
Steel on *B3*	5.075		6.35			6.025	13.10
Struthers *Y1*				8.775			
Torrance *C7*							
Williamsport *S5*		6.15					
Youngstown *R3*				8.775			

COKE

Furnace, beehive (f.o.b. oven) Connellsville, Pa.	Net-Ton $14.50 to $14.75
Foundry, beehive (f.o.b. oven)	$17.00 to $18.00
Foundry, oven coke	
Buffalo, del'd	$30.75
Detroit, f.o.b.	29.50
New England, del'd	30.55
Seaboard, N. J., f.o.b.	28.75
Philadelphia, f.o.b.	28.50
Swedesland, Pa., f.o.b.	28.50
Painesville, Ohio, f.o.b.	29.50
Erie, Pa., f.o.b.	29.50
Cleveland, del'd	31.55
Cincinnati, del'd	28.55
St. Paul, f.o.b.	28.50
St. Louis, f.o.b.	30.50
Birmingham, f.o.b.	27.60
Milwaukee, f.o.b.	29.50
Lone Star, f.o.b.	25.50

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Leng'h (In.)	Price
24	84	24.75	40	108,110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2½	30	37.25			
2	24	57.75			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Cast elliptical, 18 in. or longer, 5000 lb lots	62.92
Electrodeposited	50.28
Brass, 80-20, ball anodes, 2000 lb or more	60.00
Zinc, ball anodes, 2000 lb lots (for elliptical add 2¢ per lb)	21.25
Nickel, 99 pct plus, rolled carbon (rolled depolarized add 3¢ per lb)	90.50
Cadmium	$1.70
Tin, ball anodes and elliptical	$1.06 to $1.10

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	80.50
Copper sulphate, 5 or more 100 lb bags, per cwt.	27.15
Nickel salts, single, 4-100 lb bags	38.25
Nickel chloride, freight allowed, 300 lb	46.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums (Philadelphia price 22.60)	22.35
Zinc cyanide, 100 to 900 lb	55.55
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 1 to 20 100 lb drums	29.25

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts	Pct Discounts: Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	55	55½	60½	61½
7/8" thru 1" x longer than 6"	46½	50	52½	54
Rolled thread carriage bolts ⅜ in. & smaller x 6 in. and shorter	55	58½	60½	61½
Lag, all diam. x 6" & shorter	55	58	60	61
Lag, all diam. longer than 6 in.	47	50	52	53
Plow bolts, ½" and smaller x 6" and shorter	54	57½	59	60

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full Case or Keg Price
¾ in. or smaller	63
⅞ in. to 1 in. inclusive	59½
1⅛ in. to 1½ in. inclusive	64
1⅝ in. and larger	58
C.P. Hex regular & hvy.	
¾ in. and smaller	63
⅞ in. to 1½ in. inclusive	59½
1⅝ in. and larger	58
Hot Galv. Nuts (All Types)	
¾" and smaller	50
Semi-finished Hex Nuts	
¾ in. and smaller	63
⅞ in. to 1½ in. inclusive	59½
1⅝ in. and larger	58

(Add 25 pct for broken case or keg quantities)

Finished	
1" and smaller	65

Rivets	Base per 100 lb
½ in. and larger	$10.85
	Pct Off List
7/16 in. and smaller	26½

Cap Screws

	Discount (Packages): Bright Treated	H. C. Heat
New std. hex head, packaged		
⅝" diam. and smaller x 6" and shorter	47	34
¾", ⅞" and 1" diam. x 6" and shorter	31	13
⅝" diam. and smaller x longer than 6"	18½	+ 1
¾", ⅞" and 1" diam. & longer than 6"	5½	+19½

	C-1018 Steel Full-Finished Cartons	Bulk
⅛" through ⅝" dia. x 6" and shorter	47	63
¾" through 1" dia. x 6" and shorter	31	51½

Minimum quantity—⅛" through ⅝" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Quantity	Discount Mach. Screws	Stove Bolts
Cartons		19	32
Bulk			
To ¼" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	15,000-100,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screw & Stove Bolt Nuts

	Quantity	Discount Hex	Square
In cartons		16	19
In Bulk			
⅜" diam. & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	119.0
New York	131.4
Chicago	133.4
San Francisco-L. A.	140.2

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick	Carloads per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$128.00
No. 1 Ohio	128.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	20.00
Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$140.00
Childs, Hays, Pa.	145.00
Chicago District	150.00
Western Utah	144.00-165.00
California	170.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	150.00-157.00
Silica cement, net ton, bulk, Latrobe	26.50
Silica cement, net ton, bulk, Chicago	24.00
Silica cement, net tons, bulk, Ensley, Ala.	25.50
Silica cement, net ton, bulk, Mt. Union	23.00
Silica cement, net ton, bulk, Utah and Calif.	35.00

Chrome Brick	Per net ton
Standard chemically bonded, Balt.	$98.00
Standards chemically bonded, Curtiner, Calif.	108.00
Burned, Balt.	92.00
Magnesite Brick	
Standard, Baltimore	$121.00
Chemically bonded, Baltimore	109.00

Grain Magnesite St. ⅝ to ½-in. grains	
Domestic, f.o.b. Baltimore in bulk	$69.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	43.00
in sacks	49.00

Dead Burned Dolomite	Per net ton
F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.00
Midwest	16.35
Missouri Valley	15.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron f.o.b. Riverton, N. J., ocean bags	8.50¢
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	8.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+% Fe	.86.0¢ to $1.55
Aluminum freight allowed	38.00¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	59.50¢
Copper, reduced	59.50¢
Cadmium, 100-199 lb, 95¢ plus metal value	
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd	$5.00
Lead	8.90¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	$3.35 to $3.85
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed #80	$1.13
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	99.0¢
Stainless steel, 316	$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.50
Zinc, 10 ton lots	18.75¢ to 32.50¢

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DYNAMITE ACTION!

More Effective Than Ever—Marla Aero Spray Penetrating Oil Gives You The Advantages of:

1. SPRAY. Assures penetration, with pressure, to the most hard to get at objects. Shoots a stream three feet if needed.
2. SPEED. Always ready at the touch of a button. The fastest acting non acid, non alkali penetrating oil known or money back.
3. ECONOMICAL. Spray container eliminates wasted surplus and time in application. Cannot leak or spill.
4. HANDY. Carried easily and is always ready for use. No chance for ingredients to weaken by exposure to air from a misplaced cap.
5. VERSATILE. Marla Spray Penetrating Oil is used to free the most corroded bolts, screws, pipe threads, bearings, bushings, pulleys, manifolds, valve guides, locks or any other stuck together metal parts.

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OPEN GEAR SPRAY LUBRICANT

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Sticks to Metal

1. ECONOMICAL—Spray container reduces lubrication time. Long lasting film. One can covers approximately 25 sq. ft. of surface with no waste.
2. HEAVY DUTY—The finest extreme pressure adhesive lubricant there is for open gears.
3. EASY-TO-USE—No fuss . . . no muss. Ease of application encourages and assures complete lubrication of open gears.
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5. SPRAY—Assures perfect lubrication even to the most hard-to-get-at area.
6. HANDY—Marla Spray Lubricant can be carried easily and is always ready for use. Eliminates the brush, paddle or any preheating.
7. VERSATILE. A superior lubricant also for cams, reciprocating actions, mono rails, guides, chains, sprockets and cables.

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Case of Twelve—12-ounce Cans 21.00

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Branches: New York, Philadelphia, Chicago, Berkeley, Calif., Ft. Lauderdale, Fla.
Manufacturers of OWEN CLAMSHELL BUCKETS

Ferroalloy Prices

(Effective Oct. 23, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C ...	41.50	0.20% C ...	38.50
0.03% C ...	41.00	0.50% C ...	38.25
0.06% C ...	39.50	1.00% C ...	37.50
0.10% C ...	39.00	1.50% C ...	37.35
0.15% C ...	38.75	2.00% C ...	37.25

4.00-4.50% C, 67.70% Cr, 1-2% Si.. 27.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.75
0.025% C (Simplex) 34.75
0.10% C, 50-52% Cr, 2% max Si.... 35.75
6.50% max. C, 50-55% Cr, 3-6% Si. 24.00
6.50% C, 50-55% Cr, 3% max Si.... 24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 33-91% Cr, 0.75% Fe..	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 8-in. x down, per lb of Cr, packed.

Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr. 20% Fe ½ in. x 12 mesh.

Ton lots	20.15
Less ton lots	21.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19½ Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11% Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.75
Johnstown, Pa.	11.75
Sheridan, Pa.	11.75
Philo, Ohio	11.75
S. Duquesne	11.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.90
Ton lots packed	16.30

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$97.50
19 to 21%	3% max.	99.50
21 to 23%	3% max.	102.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	33.00
Ton lots	35.00
250 to 1999 lb	37.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 24.15

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn.....	35.80	38.60	39.80
0.07% max. C	33.75	36.55	37.75
0.10% max. C	33.00	35.80	37.00
0.15% max. C	32.25	35.05	36.25
0.30% max. C	30.75	33.55	34.75
0.50% max. C	30.25	33.05	34.25
0.75% max. C, 80.85% Mn, 5.0-7.0% Si....	27.25	30.05	31.25

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b shipping point.

Carloads bulk	12.95
Ton lots	14.60
Briquet contract basis carloads, bulk, delivered, per lb of briquet.....	14.40
Ton lots, packed	16.80

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe ...	23.95	22.65
98% Si, 0.75% Fe	24.45	23.15

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si. briquets.

Carloads, bulk	7.55
Ton lots, packed	10.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si ...	13.50	75% Si ...	16.40
65% Si ...	15.25	85% Si ...	18.10
	90% Si. ...	19.50	

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots .	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.20
Crucible	3.30
High speed steel (Primos)	3.40

Alsifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound Contained Mo. $1.28

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Sb plus Ta..... $4.95

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.54

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.50
Less ton lots $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y. freight allowed, carload, per net ton..... $215.00

Ferrotungsten, ½ x down, packed, per pounds contained W, ton lots, delivered $3.45

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. $1.32
bags, f.o.b. Washington, Pa. Langeloth, Pa. $1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump.....	18.50¢
Ton lots, packed lump.....	20.50¢
Less ton lots.....	21.00¢

Vanadium oxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.38

Zirconium contract basis, per lb of alloy
35-40% f.o.b. freight allowed, carloads, packed ..... 27.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload..... $5.50

Bortam, f.o.b. Niagara Falls
Ton lots, per pound..... 45¢
Less ton lots, per pound.... 50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed
Ton lots per pound..... 14.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots 1.20
F.o.b. Wash., Pa. Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ..... .85
14 to 19% B 1.20
19% min. B 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
Ton lots $1.46
Less ton lots 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots..... $2.05

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Mfg. Westinghouse **Government Surplus**

Components Beach-Russ, 100 CFM Mechanical pump operated by 5 HP, 440 V, 60 Cycle, 3 P. Motor, Booster Oil Pump, 5000 W Calrod Heater. Oil diffusion Pump, Mechanical Refrigeration unit. 2 Westinghouse McLeod Gauges. 12" Valve at outlet of diffusion pump. Units have been tested as low as 50 Milli-Microns. Condition used, good. Quality 7. Price $2,750.00 each.

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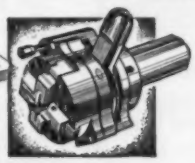

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Time for Review . . . With business now firmly started on the final quarter of the year, it seems opportune to review and summarize the outlook for the rest of 1956 and the early months at least of 1957.

New York dealers report continued good business, with any slump in orders probably due more to fall sports calendar than any other cause. Customers are still lining up for good late-model used tools, particularly in the heavier duty classifications.

No Braking . . . Tight money may have some braking effect, but recent experience appears to show that almost any going firm with a real need for machinery credit will be able to get it, although at higher rates.

The new tool market is worth some attention. Relationship between new and used tool business volume can sometimes be complex, but experienced dealers watch both closely. By the end of August, machine tool builders' backlog was computed at 7.7 months. New orders were up to $87.5 million, a sharp rise from July's $61.9 million.

Coming: 20 Pct Rise? . . . A spokesman for one of the nation's leading tool and machinery makers has recently predicted that new machine tool sales in 1957 should jet up 20 pct over this year's levels. But, he adds, current high backlogs will hold next year's shipments to only a 5-10 pct increase over 1956. Overall sales of construction equipment next year should be up 20-25 pct, the same source figures, with the Federal road program accounting for at least 15 pct. The whole broad category of machinery and equipment should show a gain of about 6 pct for the coming year.

Sun Will Shine . . . All of this omens bright prospects for the used machinery industry. New machine tool and construction equipment builders will be booking orders about twice as fast as they can fill them, and there is the obvious implication that many companies just can't wait that long for deliveries on new equipment. And this ignores the attractive opportunities for cash savings through purchase of used tools—opportunities doubly attractive when money is expensive.

Second Quarter Report . . . Census Bureau of U. S. Department of Commerce reports metalworking machine shipments for second quarter of '56 approximated $289,127,000 as compared with $207,127,000 for the same period of '55.

Cutting type machines accounted for $211,065,000 of the total. This was 15 pct over first quarter of 1956 and 34 pct above shipments for second quarter of 1955. Lathes, grinding and milling machines, and boring machines represented largest portion of new orders. Unfilled orders for 1956, as of June 30th, for cutting type machines approximated $586 million.

Forming and shaping machine shipments were approximately $78,062,000 of the total, up 20 pct from the first quarter of '56. Mechanical presses and bending machines dominated shipments. Unfilled orders approximated $296 million.

Exports in first quarter of '56 showed a 3 pct increase of $22.7 million with imports up 11 pct at $5 million.

Man for the Job . . . Metalworking Division of the Business and Defense Services Administration has invited a man from industry to head up the section for six months "without compensation." J. Robert Jones has been named Director of the Department. He is Vice President in Charge of sales for Kearney & Trecker Corp.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDER & STRAIGHTENER
#4 H & J, Capacity 15" I-beams, 9" Girder Rail, 100 lb. Tee Rails, Motor Drive

BENDING ROLLS
6' x 3/16" Niagara Initial Type
8' x ⅛" Webb 129-V Vertical
12' x ⅝" Southwark Pyramid Type
16' x ⅝" Niles Pyramid Type
20' x 1" Hilles & Jones Pyramid Type

BRAKES—LEAF TYPE
12' x ¼" Dreis & Krump
12' x ⅛" Dreis & Krump Motor Driven

BRAKES—PRESS TYPE
10' x ¾" Superior Hydraulic, NEW
12' x ½" Superior Hydraulic, NEW

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	29' Span 230 Volt D.C.
5 ton Whiting	48' Span 220/3/60 A.C.
5 ton Shaw	56' Span 230 Volt D.C.
10 ton Cyclops	40' Span 220/440 A.C.
15 ton P&H	46' Span 230 Volt D.C.
25 ton L-B	75' Span 220/3/60 A.C.
Incl. 300 ft. Runway	
80 ton Niles	72' Span 230 Volt D.C.
120 ton Niles	68' Span 440/3/60 A.C.

FORGING MACHINES
1" to 5" Acme, Ajax, National

HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING—800 lb. to 20,000 lb.

LEVELLERS—ROLLER
44" Newbold, Nine Rolls 4" Dia.
54" Aetna Standard, 17 Rolls 3¾" Dia.
72" McKay, 17 Rolls 4¼" Dia.

PRESSES—HYDRAULIC
250 ton Bliss Double Acting 42" Stroke 48x49" Bed
500 ton Elmes 18" Stroke Lower Platen 38" x 66"
750 ton Baldwin Triple Acting Bolster 84" x 133"
1200 ton United Steam Hydraulic Forging Press
4500 Baldwin-Lima-Hamilton Hydr. Forging Press

PRESS—INCLINED
125 ton Beatty Open Back, 1½" Stroke, Area of Bed 28¾ x 26¾"

PRESS—STRAIGHT SIDE
Clearing Model TF41500-200 Triple Acting Strokes 40, 32, 14", Bed Area 100" x 200"
100 ton Clearing, 14" Stroke, 36" x 36" Bed
250 ton Bliss, 16" Stroke, 29" x 29" Bed
250 ton Toledo, 6" Stroke, 36" x 72" Bed

PUNCH—BEAM
#7 Kling Universal Punch, Capacity Punch 1¼ x 1" 118 Ton, Punches in flange & web of H-Beams, I-Beams & Channels

PUNCH & SHEAR COMBINATIONS
#44 x 48 Buffalo RAP, Capacity ½" x ⅜"
Cleveland Style G Single End, 60" Throat
No. 1½ Buffalo Universal Ironworker

ROLLS—PLATE STRAIGHTENING
72" Bertsch, Seven Rolls 7" Dia.
86" H & J, Six Rolls 10" Dia.
12' Newbold, Nine Rolls 14" Dia.

ROLLING MILLS
10" x 16" Single Stand, Two High
12" x 14" Twelve Stand, Two High Strip Mill
12" x 16" Phila. Single Stand, Two High
15" x 30" G & M Single Stand, Two High
16" x 24" Farrel Two Stand, Two High
20" x 60" Two High Breakdown Mill
26" x 54" United Single Stand, Two High
26" x 72" H.P. Cold Rolling Mill
44" x 28" x 44" x 144" Three High
22" x 12" x 40" Lewis 3-High Shut Mill

SHEAR ANGLE
6" x 6" x ⅞" Hilles & Jones

SHEAR—GATE
80" x ⅜" Pels Model S T A U—22, All Steel

SHEAR—ROTARY
#23A Quickwork Whiting, 3/16" Capy.
#250 Kling, ¼" Capy.

SHEARS—SQUARING
8' x ¼" Niagara, LATE
10' x ¼" Cincinnati, LATE
16' x ¼" Toledo

SLITTERS
12" Blake & Johnson
52" Yoder #3, 5" Arbor, Motor Driven

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Model W-29 Torrington. Wire Dia. .008" to .028" Wire Length per spring .57" to .665"

SWAGING MACHINE
#6½A Fenn, Capacity 2¼" Tube, 3¾" Solid 10" Die Length, Hydraulic Feed, LATE

TESTING MACHINES
60,000, 100,000, 200,000 Olsen & Riehle Universal 50,000 and 300,000 lb Compression

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Etna 1K Welded Tube Mill, Cut-off & Transformer Capy. ½" OD 0.28 wall to 2" OD .120 wall

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SLIP RING MOTORS
Constant Duty 3 Phase 60 Cycle

Qu.	H.P.	R.P.M.	Make	Type	Volt
1	100	430	Al. Ch.		220/440
2	100	495	G.E.	IM-15A	2300
1	100	570	G.E.	MT-562	220/440
1	100	870	Whse.	CW	220/440
1	100	900	El. Dy.	EDX612	2300
1	100	1160	Whse.	CW	220/440
1	100	435	Whse.	CW 1000	220/440
1	150	490	Whse.	CW	220/440
1	150	585	Whse.	CW	4160/2260
1	150	705	Al. Ch.	ANY	220/440
1	200	490	G.E.	IM-14	2200
2	200	585	G.E.	IM-16	2200
1	200	1760	G.E.	IM-13B	2200
1	250	300	G.E.	MT-414	2200
1	250	705	Al. Ch.	ANY	220/440
1	350	450	G.E.	MT-412	2200
1	400	280	Whse.	CW	2200
1	400	565	Al. Ch.	ANY	2200
2	450	440	Whse.	CW	2200
1	500	450	G.E.	1M	2300
2	500	505	Al. Ch.	ARY	2300
1	700	295	Whse.	CW	2300
1	750	400	G.E.	1M	2200
1	1000	445	Whse.	CW	2300
1	1500	360	G.E.	Mill type	2300
1	1800	270	Whse.	Mill type	6600/4000
2	2500	257	G.E.	Mill type	2300

SYNCHRONOUS MOTORS
3 phase—60 cycle

Qu.	H.P.	R.P.M.	Make	Type	Volt
1	2500	720	Whse.	.8 PF	2200/4160
1	2000	900	Whse.	.8 PF	2300
1	1500	514	Whse.	.8 PF	2300
1	1000	1200	El. Mchy.	.8 PF	440
1	1000	900	G.E.	.8 PF	2300
1	710	720	G.E.	.8 PF	440/2300
1	450	138	Whse.	1.0 PF	2200
1	300	720	G.E.	TS 962	440/2300
1	300	600	G.E.	TS 7656	2200
2	280	900	Cr. Wh.	.8 PF	2300
1	250	600	Whse.	.8 PF	220/440
1	200	514	Al. Ch.	1.0 PF	2300
1	200	450	G.E.	.8 PF	440
1	200	360	Al. Ch.	1.0 PF	440/2300/4
1	150	900	G.E.	ATI	2200
1	150	720	El. Mchy.	.8 PF	220/440
1	150	600	G.E.	TS 7641	550
2	125	900	G.E.	TS 963	4000/2200
1	125	900	El. Mchy.	1.0 PF	4800/2400
1	125	900	G.E.	TS 7556	2200
2	100	1800	Whse.	.8 PF	220/440
1	100	900	Ideal	.8 PF	220/440
2	100	600	G.E.	TS 7641	220/440
1	100	360	El. Mchy.	1.0 PF	220/440

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D. C. MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	2200	G.E.	MCF	600	400/500
1	1000	G.E.	MCF	600	350/700
1	940	Whse.	QM	250	140/170
1	800	Whse.		250	450/550
1	500	Whse.	CC-216	600	300/900
2	450	Whse.		550	415
1	250	G.E.	MPC	230	400/600
1	200	Whse.	CB-5113	250	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	65H	230	1150
1	150	Whse.	SK-151B	230	900/1800
1	125	Whse.	SK-183	230	850
1	120	G.E.	MPC	230	250/1000
2	100	Whse.	SK-181	230	450/1000
2	75	C.W.	53H-TEFC	230	860
1	50	G.E.	MD-412AE	230	550
1	50	Whse.	SK-131.5 B.B.D.P.	230	600/2200
4	30/40	Whse.	SK-131	230	500/1500

M-G Sets—3 ph. 60 Cy.

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
1	3000(3U)	G.E.	514	600	4000/6900/ 13200
2	2000/2400	G.E.	450	250/300	2300/4600
1	1750/2100	G.E.	514	1100	4000/6900/
1	2000	G.E.	500 25cg	660	11500
1	2000	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1000	G.E.	900	260	4000/6900
1	750	G.E.	720	125/250	2300/4600
1	500	G.E.	900	540/540	4150
1	500	Whse.	900	125/250	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
1	3000	A.C.	OISC	3	33000x2300
1	2500	A.C.	Furnace	3	13800x147/113.5
1	2500	A.C.	OISC	3	34529x13800
4	2000	Whse.	OISC	3	6900x480
1	2000	Whse.	OISC	3	6900x2300/3985Y
1	800	G.E.	H	1	13800x460
3	1000	Wagner	OISC	1	13200x460
3	1000	G.E.	HVDDJ	1	2400x480
3	500	G.E.	H	1	2400/4800x480
1	500	Al. Ch.	OISC	1	4800x208
1	500	G.E.	OISC	1	13200x2300
3	667	G.E.	HD	1	13800x2300
3	500	Kuhl	OISC	1	13200x4618
3	333	G.E.	HS	1	7200x2400/4140Y
3	333	G.E.	HD	1	13200x2300
3	333	G.E.	HSWR	1	2300/4000x230/460
3	333	G.E.	H	1	6900x230/460
1	300	G.E.	HT	3	4160x480/277

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DRILLS
5' Arm 13" Foodick Economax hyd. radial, new 1943.

GRINDING MACHINES
72" Hanchett 3-spd. rotary surface, new 1946.
14" x 36" Pratt & Whitney hyd. vert. surface, 1942.
No. 74 Heald hyd. pl. internal, X-sliding H. S., 1941.
18" x 36" Landis type C hyd. pl. cylindrical, 1942.
6" x 30" Cincinnati EA Filmatic pl. cylindrical, 1942.

HAMMERS
No. 3C Chambersburg pneumatic, serial No. 2287.
No. 6-1 Nazel, pneumatic, late.
No. 6B Nazel, self-contained.

LATHES
No. 3 Gisholt Univ. Turret Lathes (2), 1942.
14" x 6' Hendey Toolroom, 1940.
15" 30" Lipe Carbo-Matic, 1942.
36" x 42" Bullard New Era vertical turret lathes.
128" x 90" CC Niles Bement Pond engine lathe, 90 HP. M.D.

MILLING MACHINES
No. 2 Brown & Sharpe vertical mill, new 1943.
No. 4 Cincinnati high power plain horizontal mill, serial E 506 J.
No. 5-48 Cincinnati hydromatic duplex mill, serial 3851DIK-5.
No. 2-24 Cincinnati automatic simplex mill, serial No. 1B3PIT-1.

PLANERS
42" x 42" x 12' Liberty dbl. housing planer, 35 HP M.D.
48" x 48" x 10' Gray Maxi-Service.

PRESSES
90 ton No. 92½C Toledo D.C. Str. Side.
250 ton No. 79S½-72 Toledo D.C., Toggle drawing.
500 ton No. 1039 Hamilton D.C. adj. bed. 60" x 102".
2000 ton No. 6 National Maxipress Forging Press.

SHAPERS & SLOTTERS
24" Gould & Eberhardt Universal.
32" G & E Invincible, F.M.D.
36" Rockford hyd. vertical slotter, new 1944.

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1½" National Upsetter, guided ram, hard ways.
3½" Ajax suspended slides, steel frame.
4" National high duty, susp. & guided rams.
7½" National Upsetter, air clutch, new 1944.

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150 HP Fawcus H8DR2	11.7:1.
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100 HP GE	3.59:1.
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10 HP Hors Scott RS1000	6.14:1.

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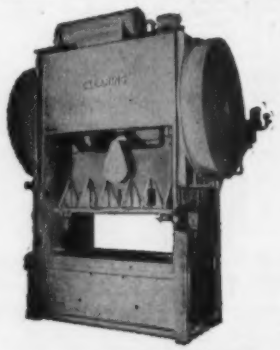

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METALWORKING BRIEFS

Ingalls Gets Ship, Oil Equipment Orders

Keel for the second of two $23 million-plus cargo-passenger ships being built for Moore-McCormick Lines, Inc., has been laid at the Pascagoula, Miss., shipyard of Ingalls Shipbuilding Corp. Launching is scheduled for next July. Ingalls also has received a multi-million-dollar contract from Mobile Offshore Co. of Houston, for construction of a mobile offshore drilling platform larger than the one just completed for Kerr-McGee.

Navy Awards Missile Launcher Contract

Northern Ordnance, Inc., Minneapolis, will handle a new Navy contract to produce $23 million worth of guided missile launching equipment for a new class of vessels. The equipment will launch the terrier antiaircraft missile from frigates, two of which now are planned. The producer is a Navy-owned plant operated for the Navy Bureau of Ordnance.

Armco Asks Fast-Tax Aid For Stainless Mill

Armco Steel Corp. has applied to the Defense Dept. for a certificate of necessity for fast tax amortization of a $55 million expansion program. The company is basing its request on demand for Armco stainless steel in military aircraft and guided missiles. Part of the expansion is already underway at the company's Butler, Pa., works.

Fast Tax Write-Off Probe

Sen. Harry Byrd, Virginia Democrat, has ordered an investigation of defense plant tax amortization. "It is my opinion," he stated in a letter to Arthur Flemming, ODM director, "That under present peacetime conditions, such special privilege can be justified only in exceptional and rare cases." The probe comes as steel companies have pending applications for fast amortization of new construction totaling $1,200,000,000.

Where Aluminum Goes

Consumer durable goods, building materials and transportation equipment accounted for 49.4 pct of total shipments of wrought aluminum products, according to the Aluminum Assn. Building materials accounted for 19 pct of all shipments during the first six months of this year, consumer durables 13 pct, and transportation 17.4 pct.

Copper Prices Continue Decline

Custom smelters cut prices another two cents early this week to 35¢ per lb. This is more than 20¢ under the high level of last March. Pressure continues to mount for producers to cut their price, currently at 40¢.

ADVERTISERS

An asterisk beside the name of advertiser indicates that a booklet, or other information, is offered in the advertisement. Write to the manufacturer for your copies today.

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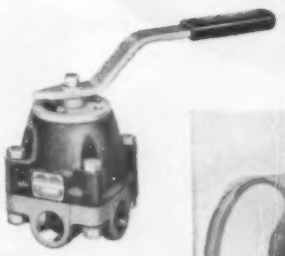
For High Pressure (to 6000 P.S.I.)

MANUAL WATER VALVES

that last

Specify "SHEAR-SEAL" design



4-Way, Manipulator, Dual pressure and Shut-off Valves from ¼ to 1½" N.P.T.

Note the mirrorlike sealing surfaces on this Dual Pressure Valve rotor after 4 years of service.

On extrusion presses, die casting machines, rubber and plastic molding presses and on blowout preventers, they have performed without maintenance longer than any other type of valve.

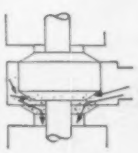
This LONG, MAINTENANCE-FREE SERVICE is possible because the metal-to-metal sealing surfaces are self-aligning and actually improve with use through continued lapping action. Sealing qualities do not diminish because a spring compensates for the wear.

DIRT CANNOT SCORE SEALS because flow is through "Shear-Seals," sealing surfaces remain in constant intimate contact.

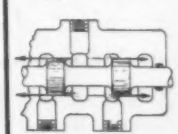
COMPLETE CONTROL OF YOUR CIRCUIT because "Shear-Seal" design is excellent for throttling. It permits opening to any desired degree of flow with smooth action and without fighting fluid pressure.

The "Shear-Seal" action eliminates line surges and the round tubular flow passages provide more flow and velocity capacity (up to 60 ft. per sec.) because they are unobstructed by spools or poppets.

This is why we don't use **SPOOL OR POPPET DESIGN**



Poppets score



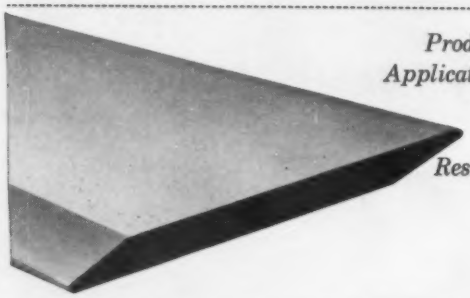
Spools leak

Write for Bulletin W-5.

BARKSDALE VALVES

5125 Alcoa Avenue, Los Angeles 58, California

How Special Sections are cutting costs for four manufacturers



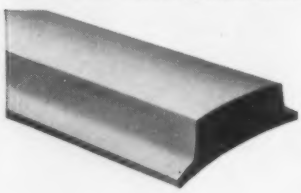
Product: **Cutting edge for earth-moving equipment.**

Application: Our customer formerly flame-cut bevels on square-edge plates to form cutting edges. He substituted this double-bevel carbon-steel special section, which weighs 29 lb per ft compared with the plate which weighed 34 lb per ft.

Results: 1. Because of reduced steel requirements, the section actually costs *less* per ft than the plate.

2. The flame-cutting operation, which cost approximately $1.00 per ft, has been eliminated.

3. Shipping costs were reduced and scrap avoided; production was speeded up and the appearance of the product improved.

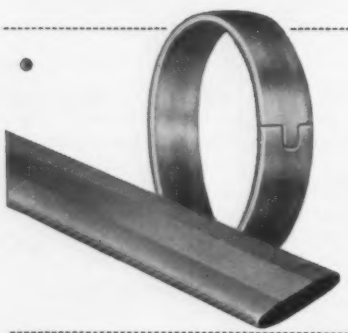


Product: **Pole-piece section for electric motor.**

Application: Our customer had found that laminating these small pieces or forming them hot or cold from flat blanks was costly and inefficient. He switched to a special section rolled to the desired shape and dimensions.

Results: 1. Though the special section costs more than flat stock, the lowered production costs have resulted in significant savings.

2. The customer now gets a better product with fewer production problems.

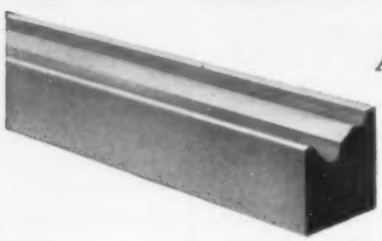


Product: **Timber ring section.**

Application: Customer forms the special section into rings which fit into conforming grooves cut in timbers. Together with a single bolt they provide strong, tight, economical joints for timber trusses. This wedge-shaped ring fits tighter, and can be inserted into the grooves more easily than older-type rings formed from flat strips or single bevels.

Results: 1. One Teco "wedge-fit" connection does the job of 4 to 5 bolts or 20 nails.

2. Easier installation of these rings results in faster production, and savings in time and labor.



Product: **Carriage-rail section for electric typewriter.**

Application: Customer formerly used square stock that required machining away about 17 pct of the metal. This entailed high production costs and metal loss through scrap. He has now standardized on this special section, which is accurately hot-rolled, then cold-drawn to precise dimensions.

Results: 1. Costly machining operations and loss of metal completely eliminated.

2. Production speeded up considerably.

These are but a few examples of the ways in which hot-rolled special sections are being used to advantage. We urge you to consider how special sections could give you greater freedom of design, bypass expensive processing operations and tool costs, cut production time and avoid scrap. We'd be happy to discuss possibilities with you. Kindly call or write the Bethlehem sales office nearest you.

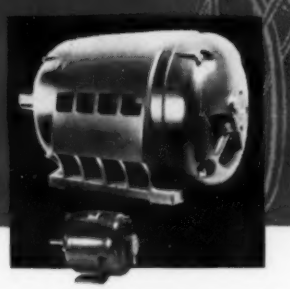
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Why not build the cart before the horses?



Just tell us here at Master what you want in power drives—and get the utmost in flexibility, compactness and performance. It probably won't be as complicated as the multi-shaft Gearmotor illustrated here, with 14 shafts turning at diverse speeds. But, regardless of what you need, Master can supply the right combination of horsepower, shaft speed and mounting features with whatever Master components are required—all combined in one compact efficient unit. Just ask for information.

Motor Ratings	⅛ to 400 H.P. All phases, voltages and frequencies.
Motor Types	Squirrel cage, slip ring, synchronous, repulsion-start induction, capacitor, direct current.
Construction	Open, enclosed, splash-proof, fan-cooled, explosion-proof, special purpose.
Speeds	Single-speed, multi-speed, and variable speed.
Installation	Horizontal or vertical, with or without flanges and other features.
Power Drive Features	Electric brakes (2 types)—5 types of gear reduction up to 432 to 1 ratio. Mechanical and electronic variable speed units—fluid drives —every type of mounting.

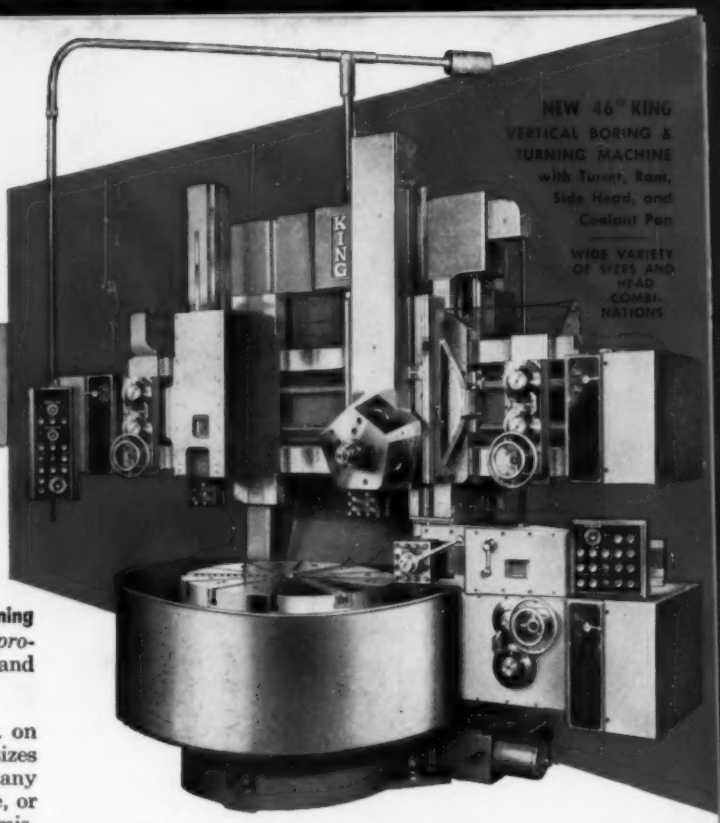
THE MASTER ELECTRIC COMPANY, Dayton 1, Ohio

POWERED FOR PRODUCTIVITY

...the all new

KING

greater horsepower — expanded speed and feed ranges — permit use of modern cutting tools to their fullest capabilities


NEW 46" KING
VERTICAL BORING & TURNING MACHINE with Turret, Ram, Side Head, and Coolant Pan
WIDE VARIETY OF SIZES AND HEAD COMBINATIONS
KING

Completely re-designed King® Vertical Boring & Turning Machines bring to boring mill users the *greatest productive capacity ever achieved* for vertical boring and turning work.

Horsepower has been increased to 40 to 50 H. P. on 30″ to 46″ machine sizes; 75 to 100 H. P. on sizes 56″ and up. Spindle drive provides 24 speeds in any one of three standard ranges: high, intermediate, or low. As illustrated below, complete drive transmission is mounted in an extra-rugged housing, providing greatly increased stability. The entire drive can be removed from the machine as a unit.

24 feeds from .0016″ to .250″ per revolution are provided. The exact feed can be selected to produce the desired surface finish on any material at the required production rate.

Complete electrical controls are provided, located on pendant station and on fixed panel mounted on side head, for maximum ease and speed of manipulation.

With many other features, the *all new* King provides industry with a high-efficiency machine tool capable of taking full advantage of new cutting tools, new materials, new methods. For full details, send for new Catalog K-5. Write direct or to the King distributor in your area.

Additional Features of the ALL NEW KING

- **NEW SPINDLE AND SPINDLE MOUNTING, PROVIDING MAXIMUM TABLE STABILITY.**
- **AUTOMATIC LUBRICATION OF ALL MOVING PARTS.**
- **ANTI-BACKLASH NUTS FOR ALL CROSS-FEED MOVEMENTS.**
- **MACHINE ADAPTED FOR SIMPLE OPTIONAL ADDITION OF:**

Automatic positioning of heads.
Automatic tracing control of heads.
Automatic cycling.
Power rail clamping.
Power indexing of turrets.

COMPLETE ELECTRICAL CONTROLS

All electrical controls are conveniently located on the pendant station and on a fixed panel mounted on the side head, as follows:

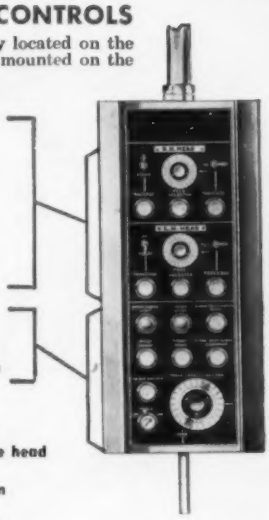
LOCATED ON PENDANT—

Feed and rapid traverse movements — and — Pre-selective feed selection from direct-reading dials: for rail heads on machines with two heads on rail . . . for rail head and side head on machines with one head on rail.

Power swiveling of rail heads

Pre-selective speed selection from direct-reading dial

Speed change • Turret index • Table stop

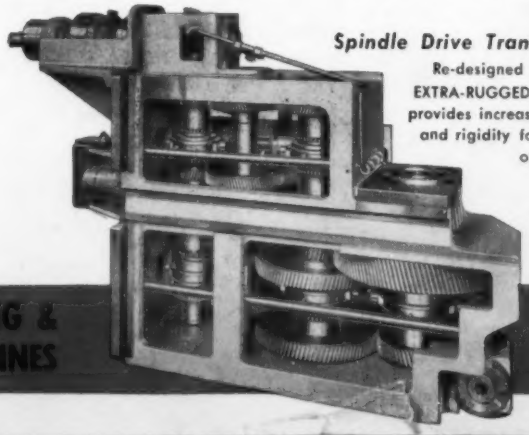


LOCATED ON SIDE HEAD PANEL—

Feed and rapid traverse movements of side head — and — Pre-selective side head feed selection from direct-reading dial: on machines with two heads on rail.

Main drive • Rail positioning • Coolant pump

Thread cutting and taper turning selection for all heads



Spindle Drive Transmission

Re-designed throughout. EXTRA-RUGGED HOUSING provides increased stability and rigidity for mounting of the shafts.

•

Short shafts used throughout with points of [illegible] located adjacent to bearing [illegible]

American Steel Foundries
KING MACHINE TOOL DIVISION
1150 Tennessee Avenue • Cincinnati 29, Ohio

KING VERTICAL BORING & TURNING MACHINES